The Chemical Age

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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A Justified Protest

THE vigorous protests which have been appearing in the *Glasgow Herald* respecting the terms of the Glasgow Corporation's advertisement for a new manager of their chemical works seem to us thoroughly justified. The points to which objection is taken on behalf of the chemical profession are three—(1) that the manager of the chemical works is to be subordinate to the general manager of the gas department; (2) that, in addition to being a "thoroughly qualified chemist able to deal fully with all liquid products from gasworks," he must also "have had experience in the sale and disposal of the manufactured products"; and (3) that no salary is announced for the post, but that applicants are invited to state the salary they require.

The trouble is largely due to the Corporation's failure to decide for themselves whether they want a responsible head of a chemical department or merely a chemical assistant or adviser to the gas manager, and to their attempt to combine the qualities and experience of the former with the conditions and status of the latter. The successful applicant, according to the advertised terms, must be a thoroughly qualified chemist (though what the precise chemical qualifications are to be is not stated), able to deal fully with all liquid products from gasworks (necessitating very thorough works experience), to advise as to the introduction and erection of the necessary plant (implying a high standard of engineering practice), and have had experience in the sale and disposal of the manufactured products (implying a previous appointment on a sales staff). Any one man possessing this rather remarkable collection of qualifications, varying from high academic and technical attainments to experience of the shop-keeping side, might be assumed to be capable of managing his own job—which in this case means the management of four large chemical works. If the Corporation really want such an official, he would be too well qualified to require supervision from the head of another department; if, on the other hand, they merely want a chemical assistant, then it is absurd to ask for such high qualifications and to dignify a subordinate post with the title of "manager." Hardly less absurd is it to require in their new chemical works manager the qualifications of a first-class chemist and engineer, and to insist that he must also have had experience as a commercial traveller. The Corporation really have some rather mixed ideas as to the functions of a chemical manager.

But, perhaps, the stipulation which carries the greatest indignity is that requiring applicants to state the salary they are prepared to accept. This is the policy one might expect from some little back-street firm, aware that there were plenty of unemployed chemists in the market, and desiring, by stimulating a little unhealthy competition among the necessitous, to cut down the pay to the cheapest competitive figure. For the governors of a great city like Glasgow, the industrial capital of a land where education is commonly understood to be prized, to descend to such a practice is a surprise of a rather painful kind. Fortunately, chemical interests are fairly well organised in Glasgow, and efforts may yet be made through the Institute of Chemistry and other bodies to restore to the Corporation some sense of what is due to the city as well as of what is due to a great profession.

Submerged Flame Boilers

So long as steam continues to be a *sine qûa non* of almost every chemical works it must be one of the primary aims of the chemical engineer to improve upon the cost of raising it by the present accepted methods. The economics of the process were well illustrated by a remark made at the conference of chemical engineers held last week to the effect that for every pound sterling we spend on fuel for putting under a boiler we have to pay a tax of at least nine

shillings for the inefficiency of the plant. It is a somewhat extraordinary fact that although steam continues to hold its place as the most common form of motive power, and although it is essential for the conduct of many everyday chemical processes such as evaporating and concentrating, we seem to have made no really revolutionary strides in the efficiency of its generation for a number of years, even though modern engineering developments have all played their smaller parts in curtailing fuel waste and thermal losses. In considering the question one is forced to the opinion that in order to improve efficiency it will be necessary to get right away from the principle at present utilised in its various modifications; that we must recast our ideas and break altogether, perhaps, with the principle of transferring heat to water through a separating wall.

For this reason few chemical engineers will fail to be intrigued by the suggestions made by Mr. Oscar Brunler that steam should be raised, not by conducting heat through a steel shell but by the direct combustion of the fuel in contact with the water; in other words, by the maintenance of a flame burning in the liquid in order to evaporate the latter. As to the problem of burning an open flame in liquids no more need be said than that there is, apart from the design of the practical equipment, no problem at all, for every form of liquid fuel will burn in a liquid so long as the quantity of air or oxygen is sufficient to ensure complete combustion. It is, however, the practical development of known principles which so frequently proves a stumbling-block, and that Mr. Brunler has been able to win through to what appears to be success is no small testimony to his pertinacity in the face of many disheartening failures. One of the most interesting features of the submerged flame boiler which he described is the fact that, in lieu of unadulterated steam, it provides a mixture of gases containing about 60 per cent. of steam and 40 per cent. of the products resulting from combustion, and for some rather unaccountable reason efficiencies of over 100 per cent. have been obtained during practical trials. Apart, however, from the merits which the system may have purely for steam-raising purposes, the chemical engineer will find it mainly interesting as a means for effecting direct evaporation. In fact, the outstanding announcement which Mr. Brunler had to make was that more than twenty different chemical solutions have been concentrated with the submerged flame and no difficulties whatever have arisen.

Relief for Machinery Users

THE conclusions of the Inter-Departmental Committee on the Rating of Machinery and Plant in England and Scotland promise some slight relief to the users of machinery and will be of interest to chemical manufacturers, to most of whom the rating of machinery is a substantial item. The Committee have come definitely to the conclusion (1) that as regards English machinery users there is, in the application of the law to the valuation of machinery and plant, a serious lack of uniformity as between different unions which ought, as far as possible, to be remedied; and (2) that machinery users are entitled to relief and that it should be given by partially exempting from rates a certain class only of machinery and plant. For this purpose it is proposed to divide machinery and plant into two classes. Class I ("motive power"), which the Committee think should be rated in full, includes:

(1) Such machinery and plant (with the structures, works, erections and appliances supporting or holding them in place), including all engines, motors, shafting and counter-shafting, cables, wires, pipes, conduits, tanks, feed pumps, economisers, mechanical stokers, mechanical chargers and fuel conveyors, as are used or intended to be used mainly or exclusively for the purposes of or directly in connection with or ancillary to:

(*a*) The creating, harnessing, conveying, controlling, applying, storing, transforming, converting or transmitting any form of power, whether steam, electric, water, gas, oil, compressed air, wind or other power (but not including portable or travelling power), provided that no process or other plant or machinery to which any such power after full development up to the stage of application is applied shall be included in this definition:

(*b*) Lighting, heating, cooking ventilating, draining, supplying water to or protecting from fire any part of the buildings or land of the rateable hereditament.

(2) Lifts and elevators.

(3) Railway and tramway lines and tracks.

(4) Plant or a combination of plant and machinery which is of the nature of a building or structure, such as gas holders, blast furnaces, coke ovens, tar distilling plants, cupolas, water towers with tanks.

Class II, which it is suggested should be subject to 25 per cent. only of the full rate, includes all plant and machinery now by law taken into account in estimating the annual value for assessment to poor rate, other than that which falls within the definition of Class I. It is proposed that the present practice of excluding from valuation loose tools, loose plant, and machines operated only by hand or foot power be definitely approved by the Legislature.

France and Sulphate of Ammonia

THE great and increasing popularity of sulphate of ammonia in France gives cause for a good deal of confidence in the future of this fertiliser. It is, perhaps, not generally known that during the latter half of the past century, when the utilisation of chemical fertilisers was just developing, agriculturists in France turned to Chilean nitrate for almost the whole of their needs. The position just before the war was that the French farmer used in total about 50,000 tons of combined nitrogen in the form of nitrate of soda, and rather less than 20,000 tons in the form of sulphate of ammonia. Some 25 years ago only a comparatively small amount of ammonia fertilisers was produced in France, the consumption of these particular compounds being mainly confined to the northern districts. The change which has occurred in the position is well illustrated by the fact that in 1921 the consumption of sodium nitrate in France had dropped to some 24,000 tons, whereas the consumption of sulphate of ammonia had increased to over 25,000 tons. Recent figures which have been published in France all go to show, moreover, that sulphate of ammonia is rapidly gaining favour as a fertiliser, and it is most improbable that Chilean nitrate will ever recover its former position. French industry is taking steps to ensure that in the near future the farmer shall have at his disposal a considerably enhanced tonnage of ammonia fertilisers which are likely to consist, not only of the sulphate, but chloride, cyanamide and urea.

A French technical journal in reviewing the situation recently stated that the preference shown by agriculturists, not only in France but throughout the world, for ammoniacal manures is entirely justified by results. In every way tests and practical results have shown that these fertilisers are fully as effective as nitrates, and although they may take effect rather more slowly they have on the other hand the advantages of functioning more smoothly and continuously and of being applicable during the autumn, on account of the salt being entirely absorbed by the soil. The possibilities which are provided for an extension of the use of fertilisers in France are illustrated by the fact that her actual consumption of pure nitrogen per acre of arable land is little more than 2 lb., as against a figure of 4·5 lb. in this country and over 10 lb. in Germany. When it is remembered, moreover, that scientists have expressed the opinion that the quantity of pure nitrogen which might usefully be employed is 12 lb. per acre (equivalent to about 56 lb. of sulphate of ammonia) it will be seen that there is in France an enormous margin between the actual and possible consumption, a margin which France would seem, by the programme which she has laid down in the way of synthetic plants, bent on reducing.

Trade Abbreviations for Sulphuric Acid

It occurs to us that the time has arrived for the adoption of some uniform trade name for concentrated sulphuric acid. In Yorkshire and certain parts of the Midlands, concentrated sulphuric acid of 95-96 per cent. H_2SO_4 is sold under the name of "D.O.V." (double oil of vitriol). In Lancashire, Staffordshire, Nottinghamshire, and the Birmingham district, the same quality of acid is known as "R.O.V." (rectified oil of vitriol), while in London and the South the trade term used is "C.O.V." (concentrated oil of vitriol). Moreover, we believe that concentrated sulphuric acid is sold in the Bristol area under the appellation of "P.O.V." (purified oil of vitriol). Surely these terms must be confusing, not alone to the layman but to many engaged in the heavy chemical trade.

Is it not time that the National Sulphuric Acid Association, Ltd., stepped in and urged the adoption of some uniform trade abbreviation? Any action they took in this matter, we have good reason to know, would be appreciated in many quarters. Whether the term "B.O.V." (brown oil of vitriol) should cover all classes of sulphuric acid of, say, 140° Tw. is now open to question. Occasional demands are made for this product to be water-white; certainly, in some cases, the term "B.O.V." is, if nothing more, a misnomer.

Silica Dust Dangers

The new rules and regulations issued this week by the Home Secretary dealing with the health of workers exposed to the danger of silica dust will come into force on May 1 next. They apply to industries in which refractory material containing not less than 80 per cent. total silica is got or manipulated. They provide for a medical board appointed by the Secretary of State, and for a company ("The Refractories Industries Compensation Fund, Ltd.") to be entrusted with the duty of collecting funds from employers and disbursing the money to workers whose rights to compensation have been proved by the medical board. The regulations contemplate the medical inspection of persons employed or to be employed in such industries, and the medical board is given power to suspend workmen from employment on account of physical unfitness. The requirements with respect to physique in the case of newly-engaged workmen are that the chest must be at least of average development with satisfactory expansion and there must be no deformity or obstruction of the upper air passages or elsewhere which interferes with respiration; that there must be no signs of present or past disease of the lungs or heart; and that there must be no sign of present or past tuberculosis of any region.

Points from Our News Pages

Books Received

Sodium Peroxide. Liverpool: The Castner-Kellner Alkali Co., Ltd.

"Suparac." Chester: The Midland Tar Distillers, Ltd.

Dizionario di Merceologia e di Chimica Applicata. Vol. III. Milan: Ulrico Hoepli. Pp. 838. L.35.

A German-English Dictionary. By Austin M. Patterson. London: Chapman and Hall. Pp. 344. 12s. 6d.

Scientific Preservation of Food. By Thomas M. Rector. London: Chapman and Hall. Pp. 214. 10s.

An Introduction to Organic Chemistry. By Alexander Lowy and Benjamin Harrow. London: Chapman and Hall. Pp. 390. 15s.

The Recovery of Gasoline from Natural Gas. By George A. Burrell. New York: The Chemical Catalog Co., Inc. $7.00.

The Calendar

Feb 23	Royal Society of Arts. Cantor Lecture (II): "The Inner Structure of Alloys." Dr. Walter Rosenhain. 8 p.m.	John Street, Adelphi, London.
26	Institute of Chemistry (Belfast and District Section): "Some Interesting Problems in Stereochemistry." C. R. Nodder.	Queen's University, Belfast.
26	Chemical Society: "Problems Presented by Films on Solid Surfaces." Sir W. B. Hardy. 8 p.m.	Institution of Mechanical Engineers, Storey's Gate, S.W.1.
27	Royal Institution of Great Britain: "Sugars from the Standpoint of the Organic Chemist." Dr. J. C. Irvine. 9 p.m.	21, Albemarle Street, London, W.1.
28 Mar. 7, 14 & 21	Royal Institution: Four Lectures. "The Counting of the Atoms." Sir Ernest Rutherford. 3 p.m.	21, Albemarle Street, London.

Chemical Engineers and Internal Combustion Boiler

Views on Mr. Oscar Brunler's Paper

THERE was an interesting discussion at the joint conference of the Chemical Engineering Group and the Institution of Chemical Engineers held in London on Wednesday, February 11, following the reading of papers (reported in THE CHEMICAL AGE last week) on "The Internal Combustion Boiler," by Mr. Oscar Brunler and "Steam Generation under Critical Conditions" by Mr. David Brownlie.

The CHAIRMAN (Mr. E. A. Alliott) said that the processes described were in quite an early stage of their careers, at any rate so far as this country was concerned. He understood that the Brunler process had been in operation on a large scale abroad for a considerable time. With regard to the other process, he had learned from Mr. Benson that a new 2,000 kw. set, with a much greater efficiency than that at Rugby, had just been started up. From one point of view, the Brunler boiler had a particular interest, inasmuch as Mr. Brunler had claimed special efficiency which could not be accounted for by ordinary methods. More details of the tests on the various chemical substances described in the paper would be helpful. In comparing the efficiency with that of a multiple effect, it looked as though the plain Brunler burner applied directly to the evaporation of a chemical would be somewhere of the order of the efficiency of an ordinary double effect, or possibly a little better, depending on circumstances.

MR. N. SWINDEN said that with regard to the Brunler boiler they were all very much surprised at the super-efficiencies obtained, and he hoped Mr. Brunler would give some actual data, so that the matter could be studied more closely. Other experiments in connection with the burning of gases under water did not lead him to hope for anything more than 96, 97 or 100 per cent. He would like to know whether, when the boiler was used for heating chemical solutions, there was any tendency for the salts to creep up the bore of the burner.

MR. H. GRIFFITHS, dealing with the Brunler boiler from the point of view of the chemical engineer, said he did not think it would compare favourably, for straightforward evaporation, with a multiple-effect plant. It might be that it had a special value for the evaporation of a corrosive solution, or something presenting special difficulties connected with heat transfer, but heat transfer was not everything. With regard to Mr. Brownlie's paper, this contained something very definite.

MR. E. KILBURN SCOTT said that he was specially interested in nitrates. The observations of Haber and Koenig, and Hahn, which were referred to in Mr. Brunler's paper, showing that the formation of nitric oxide in the electric arc and in the explosion process was greater than that calculated by chemists, who had worked it out thermally, were most important, and if Mr. Brunler was going to throw any light on that, it would be very important from a physico-chemical and an electrical point of view. He was particularly anxious to know whether powdered fuel and oil or powdered fuel and air could be burned in the Brunler boiler.

MR. R. H. PARSONS, referring to the Brunler boiler, did not think the question of efficiency could really be discussed until more particulars were given as to the methods of testing.

DR. E. FYLEMAN, referring to the production of calcium nitrate, said that he was particularly interested in the production of that by means of the Brunler boiler. Did he understand rightly that it was 5 per cent. of the nitrogen in the air which was converted into nitrate?

MR. BRUNLER said it was 5 per cent. by weight of the combustible material.

DR. FYLEMAN said that that was quite a considerable figure. He asked for further particulars as to its production, and how it was proposed to deal with the nitrates formed. Mr. Brunler had quoted Häusser, Haber and Koenig, and Hahn in relation to this extraordinary thermal efficiency. To the best of his knowledge, however, the figures obtained by those investigators had referred to the effect on the nitric oxide equilibrium, which was other than had been calculated, and he did not see that those figures had any bearing whatever on Mr. Brunler's alleged high thermal efficiency.

MR. C. TASKER, speaking of the 60 different kinds of oil which Mr. Brunler had said he had used in his boiler, asked whether he had tried burning crude fuel oil as obtained by the normal low-temperature carbonisation process.

MR. LLEWELLYN asked if any nitric oxides were produced under normal conditions of burning, without any great pressure, and, if so, whether trouble was experienced with corrosion or with the contamination of the liquids being evaporated.

PROFESSOR J. W. HINCHLEY said that the two papers under discussion were rather opposite in their ideals. With regard to Mr. Brunler's boiler, this was extremely ingenious, and he had been very much impressed with the claims made for it. He had been promised a boiler working at a pressure of 1,000 lb. per sq. inch, for work in the Chemical Engineering Laboratories at the Imperial College, and he was in agreement with Mr. Griffiths that high pressure steam was going to be of great value in the chemical industries in the future. Coming back to the Brunler boiler, he said that if, for example, it was capable of being used in the production of nitric oxide in the way Mr. Brunler had mentioned, it was quite possible that that might be an ultimate use. Those who were familiar with Professor Bone's experiments on explosions at high pressures of mixtures of nitrogen and oxygen, would remember that instantaneously a very large percentage of nitric oxide was produced, but, shortly afterwards, re-combination took place, and the amount of nitric oxide present was reduced. He believed that was the fact. The burning of a flame under the surface of the liquid would probably give conditions for the instantaneous absorption of the nitric oxide before association again took place. He considered that the boiler, from the chemical point of view, was far more interesting than from the power or evaporating point of view.

MR. HOPKINS, referring to the Brunler boiler, asked what would happen if the oil used contained a small amount of sulphur, or if nitric acid were formed from the nitrogen of the air. If the acid or vapour were carried over, would it not act upon the turbine blades or engine cylinders? He remembered a case where, in a Petter engine, crude oil and water were carried into the cylinders, and very serious corrosion indeed took place. That, it seemed to him, would happen in the Brunler boiler. If a flame containing sulphuric acid or sulphurous vapour were present in the water, the steam would carry it over, and corrosion would result.

Mr. Brunler's Reply

MR. BRUNLER, replying to the discussion, said he did not pass steam into an evaporator plant, but the chemical solutions were evaporated and concentrated in the steam generator. The solution would be fed into the generator; the flame burning in the chemical solution evaporated the water of the solution, and the steam which was passing over to the steam reservoir passed to the engine, and drove the engine; or, if the solution were concentrated at low pressure, the steam was used for pre-heating another solution. Perfect combustion was always maintained in this boiler, and it was not possible for oil to pass from the burner into the chemical solution. In the case of an oil containing a certain quantity of water, the flame would be stopped for a few seconds in the main burner, the oil would come down after the water had passed through the mouth, and the burner would pick up again from the flame of the ignition lamp, which kept the burner always at such a temperature that oil coming down evaporated and ignited again. Perfect combustion was always maintained because the oil and air were always in the same ratio, and the stoker or the man in charge could not alter the ratio between the oil and air. If they had to concentrate solutions which contained salts, it was possible that the salts would crystallise on the burner, but where chemical solutions containing salts had to be crystallised, the burner was surrounded by a water jacket, through which cold water was passed, cooling the burner continuously. The burner must be kept cool to prevent the glowing effect. As to the suggestion that perfect combustion was not obtained because oil might not evaporate in the burner, the only thing he could say was that, from practical experience, if the burner were heated up from the very beginning to such a temperature that the main regulating valve could be opened, and the ignition lamp was kept going, perfect vaporisation of the oil in the burner was obtained continuously. As to the question of the multiple-effect evaporator, he would again point out that he was not working

with a multiple-effect evaporator, as the flame was burning in direct contact with the chemical solutions. When chemical solutions containing a certain amount of acids were dealt with, the boiler had to be lined with an acid-proof lining, otherwise the steel would be affected by the acid vapours.

When burning an oil containing a certain quantity of sulphur, the water had to be treated with caustic soda or lime in order to neutralise the sulphuric acid formed during combustion. Colloidal and powdered fuels mixed with oil could be burnt in his burner, but there was the difficulty that ash was formed, and this might be carried away with the steam. He had no experience with powdered fuels in this connection, however. The 60 kinds of oil mentioned in the paper as having been used in this boiler included the cheapest oils. Oil from the tar used on streets was found to be too thick to pass through the pipes, but it was heated, so that it would pass, and then burnt, and perfect combustion was obtained. Toluol was another oil which had been burnt.

MR. BROWNLIE also replied to the various points raised concerning his paper.

Inclined Screens

To the Editor of THE CHEMICAL AGE.

SIR,—I shall be glad to show at any time to "B. P. H."—and any other interested readers of your journal—an inclined vibrating screen that leaves the mechanical and/or bumped type of screen standing as far as absence of noise, smoothness of running, and output per square foot of screening surface is concerned. The "Overstrom" patented screen, manufactured in this country under licence, oscillates at the rate of 1,400 vibrations a minute, the amplitude being only a fraction of an inch. The result is that the screen appears to the eye to be stationary, and as there are no vibrations transmitted to the supports, one has to place one's hand on the screen frame proper in order to be convinced that the screen is actually moving.
—Yours, etc.,

HUNTINGTON, HEBERLEIN AND CO., LTD.,
H. J. BUSH, Director.

47/51 King William Street, E.C.4

Alleged Improper Use of Letter

Motion by British Oxygen Co.

IN the Chancery Division on Friday, February 13, Mr. Justice Romer had before him a motion by the British Oxygen Co., Ltd., for an injunction restraining Liquid Air, Ltd., from publishing and circulating a certain letter.

MR. UPJOHN, K.C., for the plaintiffs, said that the letter was written by one of their Lancashire district managers to a customer, making a quotation for a supply of oxygen for commercial purposes. This letter, he said, had been handed round the trade, and had also been used on the Stock Exchange in a way which he hoped to satisfy his lordship was most improper. Sir Henry Slesser, K.C., now appeared for the defendants, and plaintiffs' solicitor had been handed a good deal of evidence which they desired to answer. It had, therefore, to be arranged with the defendants that the motion should stand over for a week, subject to his lordship's approval, the understanding which was given on the previous Friday by Mr. Macgillivray being continued. He would do his best to let defendants have a copy of his evidence in reply by Wednesday next, and if he could not do that and defendants wanted the motion to stand over again, he would be quite willing.

His lordship agreed.

A German Substitute for Cocaine

GERMAN scientists, working to obtain a substitute for cocaine, have discovered a new anæsthetic called tutokain, it is reported to the American Chemical Society from Cöthen. The discovery was made by Dr. Schulemann among the intermediate products which had been prepared in the manufacture of artificial rubber. Tutokain, unlike cocaine, is non-poisonous in practical use, it is said, and can be sterilised by heat without decomposition. "Cocaine," according to the Society's advice, "is so much in demand in Germany to-day that because of its habit-forming properties attempts are being made to discontinue its use and gradually to forbid its manufacture and traffic."

Chemical Trade Returns for January

Imports Up, Exports Down, on Last Year's Figures

THE imports for January of chemicals, drugs, dyes, and colours show an increase of £163,754 over the figures for January, 1924, the figures being £1,282,671 and £1,118,917. Compared with December, 1924, imports are up by £82,442. Exports, however, are down on last year's figures by no less than £293,187, the figures being £2,119,943 and £2,413,130. They are up by £66,229 on the previous month.

In the imports the figures for turpentine are doubled but some notable decreases in dyestuffs will be observed. In the export tables interesting changes are noted in connection with distilled and crude glycerin, unspecified coal tar products, benzol and toluol, and naphtha.

Imports for January

INCREASES.

		1925.	1924.
Acid, acetic	tons	696	383
Acid, tartaric	cwt.	3,289	1,916
Bleaching materials	,,	9,184	4,096
Calcium carbide	,,	89,180	58,563
Sodium compounds, except nitrate	,,	21,344	15,762
Sodium nitrate	,,	167,846	107,688
Zinc oxide	tons	841	537
White lead (dry)	cwt.	14,601	6,527
Unspecified painters' colours	,,	81,820	68,490
Essential oils, except turpentine	lb.	426,784	326,105
Potassium nitrate	cwt.	10,472	4,650
Potassium compounds, except nitrate	,,	559,743	528,544
Cream of tartar	,,	6,394	4,678
Barytes, including blanc fixe	,,	71,145	49,025
Turpentine	,,	15,648	8,198
Mercury	lb.	81,051	61,923

DECREASES.

		1925.	1924.
Intermediate coal tar dyes, including aniline oil and salt, and phenyl-glycine	cwt.	8	26
Alizarine dyestuffs	,,	5,286	12,902
Indigo, synthetic	,,	—	—
Indigo, natural	,,	24	91
Unspecified coal tar dyestuffs	,,	1,653	2,008
Glycerin, crude	,,	162	6,385
Glycerin, distilled	,,	164	222
Nickel oxide	,,	20	1,533

Exports for January

INCREASES.

		1925.	1924.
Bleaching powder	cwt.	31,474	18,565
Carbolic acid	,,	10,441	5,729
Unspecified coal tar products	,,	41,866	20,483
Glycerin, distilled	,,	26,484	7,297
Sodium chromate and bichromate	,,	5,704	2,806
Sodium sulphate, including salt cake	,,	57,371	31,562
Sodium carbonate, etc.	,,	562,698	556,974
Paints and colours ground in oil or water	,,	37,327	33,034
Anthracene	,,	2,492	1,120
Benzol and toluol	galls.	60,228	16,074

DECREASES.

		1925.	1924.
Ammonium sulphate	tons	32,434	36,289
Tar oil, creosote oil, etc.	galls.	3,668,407	5,639,441
Glycerin, crude	cwt.	66	5,180
Caustic soda	,,	147,528	151,107
Painters' colours, unspecified	,,	47,707	49,304
Acid, tartaric	,,	1,131	1,547
Acid, sulphuric	,,	3,137	4,575
Ammonium chloride	tons	236	355
Naphtha	galls.	2,413	13,531
Naphthalene	cwt.	2,180	8,347
Copper sulphate	tons	3,596	5,119
Potassium nitrate (saltpetre)	cwt.	860	1,630
Unspecified potassium compounds	,,	1,336	2,964
Potassium chromate and bichromate	,,	3,181	3,841

Olive Oil Production in 1924

THE *Board of Trade Journal* gives the following estimates of the olive oil production in a group of countries supplying 90 per cent. of the world's aggregate output:—(Centals) 1924, 16,000,000; 1923, 13,500,000; 1922, 15,700,000.

On the whole, the olive oil yield of 1924 may be considered as quite satisfactory. This is due in great measure to the yields obtained in Europe, which are decidedly better than those of the previous year, and even somewhat higher than the plentiful yields of 1922 and 1920.

The Solubility of Synthetic Resins

A Paper Read Before the Oil and Colour Chemists

At a largely attended meeting of the Oil and Colour Chemists' Association on Thursday, February 13—Dr. H. Houlston Morgan (President) in the chair—two papers were read—"Synthetic Resins and Some Aspects of their Solubility," by A. A. Drummond, and "The Painting of Ships," by R. G. Browning.

Mr. Drummond said that the term "synthetic resin" comprised a great variety of substances, widely differing in their source and behaviour and the number of patent specifications on the subject increased yearly. An estimate of the world's production of artificial resins made recently by M. Kimpflin showed monthly outputs as follows:—America, 500 tons; Germany, 300 tons; France, 100 tons. Great Britain was not mentioned, but it probably came last with a production of only some tens of tons. Broadly speaking, artificial resins of present commercial importance could be classified as follows:—(1) Those involving the condensation of some organic body, generally of phenolic character, with formaldehyde, and known as formaldehyde resins; (2) those obtained by the polymerisation of naphtha distillates containing indene and coumarone, and known as coumarone resins. In the first class, combinations of urea with formaldehyde were receiving considerable attention.

Resins from Phenols

The paper dealt only with the first class of artificial resin and chiefly in relation to resins from phenols. It was pointed out that difficulties were met with in the application of these resins owing to lack of uniformity in the quality of successive batches, with resulting irregularities in use as varnish, insulating material, etc. Improvements in the control of the manufacture of this class of resin in recent years, however, had tended to eliminate this undesirable feature and a standardised product could now be guaranteed by the manufacturer. The author had made an investigation of some of the physical properties of spirit soluble resins made under such standardised conditions, and suggested that the results were of interest in their bearing on the production of protective metal lacquers and the like. The resins examined were soluble or miscible in all proportions in such usual solvents as ethyl alcohol (and industrial spirit), butyl alcohol, amyl alcohol acetone, and also in cresols, cyclohexanol and methyl cyclohexanol. They were, however, insoluble in solvents of the benzol type, petroleum distillates, chlorinated hydrocarbons, hydrogenated naphthalenes (tetralin and decalin), turpentine and fatty oils.

It was customary to speak of the solubility of resins in a particular solvent, but the conception of the resin in the system as being analogous to a liquid had been put forward as helping towards an interpretation of the solubility of resins. The author's experience of the behaviour of formaldehyde resins supported this conception, as certain solutions of these resins could be made which precipitated on the addition of excess of solvent. The best solvents were found to lead to the quickest drying films. Wolff's conclusions could be expressed as follows:—Where the liquid medium employed remained soluble in the film in the smallest concentrations, drying could take place normally without gel formation. This explanation could be supported by experiments in which it could be shown that certain liquid media would not form clear solutions, with phenolic resins, in less than certain minimum concentrations, in one case, for instance, not below about 25 per cent. of resin. Continued addition of solvent precipitated the resin. Such a solvent might at first be considered a poor one, but solutions of higher concentration than the limiting value were found to give a film drying in normal time, and of smooth lustrous character.

Film Tests

Solutions of standard phenolic resins in various solvents were applied to metal and the properties of the resultant dried film investigated by the author. All specimens were treated similarly. A good flowing coat of resin solution, containing 20 per cent. resin, was brushed on strips of tin plate and allowed to drain in an upright position. Cuttings were taken from the plate after drying in the air for 24 hours. The lowest portion of each strip, where drainings accumulated, was rejected and the remaining portions were stoved at 220 deg. F., sample pieces being removed after ½ hour, 1½ hours and 2½ hours respectively. The polymeric changes in the film to the insoluble resistant condition was shown by testing the solubility of the film in alcohol after each period of drying and stoving. Any deficiencies in the film due to attrition under the test became obvious by brown copper deposits rapidly appearing on the exposed portions of the metal, the test being a vigorous rubbing, for about one minute, of a portion of the coated test piece with a wad of cotton-wool soaked in alcohol. The rubbed area was then brushed with a solution of cupric chloride (10 per cent. in water). Copper chloride was also used generally for testing transparent films for pinholes and other weaknesses, which soon showed their presence by the appearance of brown spots.

In the course of a discussion of the results so obtained, the author pointed out that the rate of polymerisation of phenol resins was lower than that of the corresponding cresol resins, as was shown by the general increase in the time required with the former to reach the insoluble state. The effect, on the surface of the film, of the presence of water in the solvents used (as in industrial spirit and commercial acetone) was negligible with phenol resins but tended to give a ribbed matt surface with cresol resins. Special attention was drawn to the exceptional appearance of the films containing nitrobenzene as the subsidiary solvent, its presence leading to an irregular crinkled surface of film. This effect was considered to be due to the progressive change during drying—as the alcoholic portion of the solvent evaporated—from molecular dispersion or true solution to colloidal dispersion, until finally gelation took place. The precipitated clots of resin persistently retained nitrobenzene; in fact, the air-dried films smelt of nitrobenzene, on warming, even after several months' exposure to the air. Stoving tended to drive off the nitrobenzene and break up the clots. The film was weakened in consequence and pinholes rapidly showed themselves under the alcohol-copper chloride treatment.

Finally, the author mentioned that volatility should not be forgotten in considering rates of drying, although it might be that solvent power had greater significance than volatility in questions of drying.

Discussion

The President said that although the paper only dealt with the solubility of synthetic resins it was in fact a very valuable contribution to the study of the solubility of colloidal substances in general. He believed that this was the first occasion on which a communication on the solubility of resins had been published in England. Solubility was one of the fundamental properties which the varnish and lacquer manufacturer had to consider. If the problem of solubility as regards the physical condition of the resin and of the solution could be solved not only would something be learned about the processes of solution but we should have gone a long way to answer that very vexed question of how to predict the durability of a varnish. The character of the dried film, including its properties of resistance to weather, etc., was undoubtedly dependent on the character of the solution.

Mr. Hedley Barry said that most of those who had had to deal with solutions of resins in spirits had an uneasy feeling that the distillation curve did not necessarily give the correct figure for the rate of drying of a varnish. A solvent having a high volatility would often give a much more rapidly drying film than a solvent with a lower volatility curve. The question of gelation of the residue at some particular stage in the process seemed to give a clue to the whole subject. The author was to be congratulated on having broken new ground in this branch of chemistry.

Mr. Browning, in a paper on "The Painting of Ships," gave an interesting account of the development of shipbuilding almost from the first days of ships, but the practical part of the paper was concerned with the quantities and qualities of paint required for various parts of a moderate size liner.

Union of Chemical Societies

Joint Dinner at Bristol

THERE was a large attendance on Saturday, February 14, at the annual dinner of the Bristol and South Western Counties sections of the Institute of Chemistry, Society of Chemical Industry, and the Chemical Society. Mr. W. M. Jones presided.

Professor FRANCIS, who proposed the toast of "The Chemical Society," referred to the progress of the Society in the last century, and said the simple name of chemistry was disappearing and being replaced by many branches of chemistry which he enumerated, and which were an illustration of the vast increase of our knowledge of the way in which chemistry was related with all branches of science.

Professor PHILIP (vice-president of the Society), who replied, said the Society was founded 84 years ago, and had discharged in very large measure the functions which it was founded to fulfil—to promote in this country research on chemistry and the publication of chemical research. Its volume of publications had continually increased, it had been modernised, and had a big future, as had other societies interested in chemistry in this country. That gathering was the expression of a common desire for co-operation. He mentioned the library scheme, which aimed to make the Society's library as useful as possible to every chemist in the country. That co-operation made him hopeful of co-operation between the societies in other directions. He commended the effort to develop local sections of the societies, and directed attention to the Bureau of Abstracts, of which he was chairman, the aim of which was the production of a single volume covering pure and applied chemistry. They were trying to evolve a scheme for the complete unification of abstracts in this country.

Dr. T. HOWARD BUTLER submitted the toast of "The Institute of Chemistry," and said they appreciated the efforts it had made in latter years to move with the times. He looked forward to the day when they would have but one society representing all the chemical interests. Co-operation governed industry, and he thought co-operation should govern the professions. In Bristol those interested in chemistry had co-operated, and that gathering testified to the fact.

Professor E. C. C. BALY, whose remarkable research work was alluded to by the chairman, acknowledged the toast. He referred to the value of sports to a University, remarking that a University could not be made out of a heterogeneous collection of undersized bookworms. (Laughter.) The Institute of Chemistry should not be viewed from the point of view only of the man who could pass examinations. What they required in it was men of knowledge and big vision. He had heard the criticism that they admitted people too easily without examination. But the Institute stood for more than a qualifying institution; it was something that brought them all together in a real Freemasonry of science. They should not think too much about this or that examination, but strive to teach the younger generation the real meaning of the bond which existed between them. That was why he was a strong supporter of local sections.

The toast of "The Society of Chemical Industry" was proposed by Professor MCBAIN, who said that the public did not realise how greatly chemistry underlay all our daily life, industry, agriculture, and medicine. It was not the academic training that counted so much as the use of intelligence and ability to apply natural laws of chemical phenomena in the chemical industry. He paid tribute to the valuable services of Mr. Woolcock to the industry.

Mr. W. J. U. WOOLCOCK, replying, said the Society was in robust health, 82 new members being elected at the last meeting of the Council and 82 at the previous meeting. There was an increasing number of men who combined business instincts with knowledge of their profession. He congratulated Mr. Marsden on his work, and said they were anxious to co-operate in what they could join in. He felt sincerely that there had got to come about by mutual goodwill very much closer co-operation between the three Societies. The industrial revolution followed the Napoleonic war. We came now to a time after a war infinitely more devastating, which had seen the destruction of capital and left industry in such a state that practically every country in Europe, and America as well, was in the position of having invested in machinery and plant an enormous amount of capital which could not at the moment be remunerative. The chemical industry had not suffered so badly as others, as it was working at about 66 per cent. capacity. Some other industries had not approached that figure. There was the dead weight which prevented purchase, because there was not the power to purchase; a dead weight because the costs were prohibitive and the overhead charges so great. We were waiting for something equivalent to the industrial revolution to save the country and to save Europe from a very dreadful fate. It could not be a revolution in machinery; it could be a revolution in only one way. He believed in some way or other, in some branch of science, there would have to be some startling discovery, which might come on the physical side or on the chemical side. No one could tell which, but when such a discovery was made, here or elsewhere, then he believed the hope of the people, the possibility of recovery and of liquidating the enormous burdens which every country in Europe had to carry at present would come about. For that reason the public estimation of the chemist was not to be despised. In the last ten years they had taught the public what the scientist stood for and what the chemist meant to the national life. Having done that, they had paved the way for something which might be absolutely revolutionary in its effect on industry and on the national life.

British Industries Fair at Birmingham

Important Chemical Exhibitors

THE British Industries Fair was opened on Monday at Castle Bromwich, near Birmingham, and will remain open until Friday, February 27. For the first time the London Section is being held in conjunction with the Midland Section.

Among chemical exhibits an interesting collection of bituminous paints in numerous grades as well as wood preservatives is brought together by the Mond Tar By-Products Syndicate, Ltd., London; and the exhibits of the Staveley Coal and Iron Co., Ltd., of Chesterfield, include samples of chemicals and tarred slag of various sizes made of toughened slag by a special process. The Atlas Preservative Co., London, has an interesting collection of preservatives for wood and metals, as well as decorative stains. Lacquers are displayed, and several interesting features are to be noted. The Damard Lacquer Co., of Birmingham, shows some very fine lacquering effects, as well as mouldings for the electrical and radio industries made from "Formite" synthetic resin products. Cold celluloid lacquers and varnishes are featured by the Frederick Crane Chemical Co., Ltd., of Birmingham, and their celluloid spraying and brushing enamels are also worthy of attention. The Necol Industrial Collodions, Ltd., display some of their interesting products as manufactured at Stowmarket—one is a wood finish which gives the effect of a fine French polish; and other exhibits include glossy enamels and "plastic wood." A. Boake, Roberts and Co., Ltd., show fine and technical chemicals in great variety; and the Aerograph Co., Ltd., London, give prominence to a range of paint and enamel, etc., spraying equipment. Varnishes, protective and decorative paints, and enamels are shown by Arthur Holden and Sons, Birmingham.

The Liquid Glass Co., of London, show the advantages of their products for improving the appearance of vehicles and polished surfaces generally; and there is a distinct interest in an acid-resisting chemical plant of the Paragon Rubber Manufacturing Co., Ltd., of Hull, whose exhibit also includes coverings for chemical and dyeing machines. Hand-cleansers are exhibited by Southall Bros., and Barclay, Ltd., Birmingham, "Skleen"; and by Fitchetts, Ltd., Birmingham, "Y-to"; the latter also giving prominence to soap and soap powders, etc., and lubricants. Sulphate of ammonia, benzol, creosote and other products of tar distillation are to be seen on the stand of the Marley Hill Chemical Co., Ltd., of Newcastle-on-Tyne; the Liquid Air, Ltd., Birmingham, features various products used in connection with the oxy-acetylene process; the Birmingham Gas Department show a wide range of gas-works residuals; and Hope, Hartope and Co., London, a quantity of lubricating oils and special turbine oils. Machines for the spraying of trees, horticultural and other crops, etc., are exhibited by the Midland Fan Co., Ltd., Birmingham.

Inner Structure of Alloys

Cantor Lecture by Dr. Rosenhain

AT the Royal Society of Arts on Monday, February 16, Dr. Walter Rosenhain, F.R.S., gave the first of a series of three Cantor lectures on "The Inner Structure of Alloys." The inner structure dealt with by the lecturer related to the atomic structure of metals, and the opinion was expressed that in the knowledge gained in recent years of the arrangement of atoms in crystals generally, and in the crystals of metals and alloys particularly, the key might be found to that maze of facts concerning metals accumulated by research workers during the last 40 or 50 years, and by other workers, perhaps less systematic, during the centuries before them.

After explaining the functions of an equilibrium diagram in metallurgical research, viz., a means of defining exactly what the constituents are and in what proportions those constituents will be present in any alloy of a given chemical composition at any specified temperature between absolute zero and the boiling point of the metal or even beyond it, the lecturer showed a series of slides giving the equilibrium diagrams of lead and tin, aluminium and magnesium, copper and zinc, iron and carbon, aluminium, silicon and magnesium, and so on. Then followed a series of slides of the microstructure of various alloys, together with some simple explanations of such matters as solid solutions and other things necessary as a preliminary when speaking to an audience not necessarily strictly technical. In this way a good deal of ground was covered which has already been the subject of papers before the Institute of Metals and Iron and Steel Institute and other technical institutions. Dr. Rosenhain then briefly explained the manner in which X-ray analysis has been brought to the aid of the metallurgist and confirmed facts which had previously been discovered.

X-Ray Analysis of Metals

X-ray analysis, he said, had proved that metals are crystalline. The metallurgist had discovered that twenty years ago, but X-ray analysis told us more than that. It told us not only that we had crystals in metals and what kind of crystals they were, but it showed the exact way in which the atoms of the metal were arranged in the crystals, viz., the manner in which they are arranged in what is now commonly known among physicists and others engaged in this work, as space lattices.

The various types of space lattice were then explained by means of models and diagrams. The manner in which metals like zinc and cadmium follow the hexagonal method of crystallisation, whereas copper, aluminium, gold and silver follow the cubic system, was demonstrated and the different properties of these materials, as a consequence, were pointed out. These particular metals, it was added, are regular and well behaved in their crystallisation, which any other metals are not. Antimony and bismuth have a slightly distorted system of cells known as a rhomboid, together with two interlacing sets of lattices, and these materials are brittle and differ in many respects from metals having the regular, cubic and hexagonal lattices.

Drawing attention to the numerical data for inter-atomic distances, a table of lattice constants was exhibited, these constants representing the distance, centre to centre, of the points about which the atoms swing. In commenting on the appreciable difference in the figure for various metals, the lecturer said the answer which most people would give was the different sizes of the atoms of the different metals, but he suggested that we should be cautious about coming to that conclusion. So far as was known at present, the atom is a kind of solar system. It was a centre or nucleus surrounded by groups of electrons in rapid rotation and it might be that a system of that kind effectively occupies a certain volume. It certainly did not fill it and it was the greatest possible mistake to think of atoms as if they were solid spheres which can be packed together tightly and which would only pack in accordance with a certain definite dimension.

As an illustration of that, reference was made to the fact that it had been possible, by the use of pressures of hundreds of tons per square inch, to compress metals to something like two-thirds the volume which they would occupy if the atoms were at rest and if they really had the sizes which were normally attributed to them. If it were possible to squeeze the atoms up in that way, then we could no longer regard them as rigid spheres; they normally lived at certain distances apart from one another, however, and they lived at these distances because the balance of forces between them was set up at those distances. That balance of forces depended upon certain attractive and repulsive forces which were at work. The attractive forces had a longer range than the repulsive forces; in other words, they diminished at a lower rate than the repulsive forces the farther away one got from the centre of the atom.

Some people supposed that the attractive force diminished as the cube of the distance, and the repulsive force as the ninth power. That gave results which were not very different from the facts we know, but we must regard the atom as an object which exerts forces upon its neighbouring atoms. In some cases, the forces were such that other atoms locate themselves most comfortably at a certain distance away, but it was possible by mechanical means or by chemical combination to induce those atoms to come very much closer together, or they could be pulled farther apart, within a certain definite limit. Thus atoms could not be regarded as rigid spheres. Perhaps it would be a fairer analogy to regard them as inflated balloons, although that, too, would be dangerous. Perhaps the best thing was to think of the atom as a system exerting forces, and the forces so exerted depend upon where the atoms are situated in the periodic table of the element or upon their atomic number.

In the next lecture, on Monday next, the question of the interaction of different kinds of atoms when they are brought together in a single crystal will be considered.

New Chemical Research Laboratory at Teddington

THE new Government laboratory for chemical research at Teddington, the building of which was begun by the Department of Scientific and Industrial Research towards the end of last year, is now taking shape, and it is hoped that the first section may be ready for use by the coming summer.

The new laboratory will enable the Department to bring to one centre as much of the work of applied scientific research as they may need. Until recently, an official of the Department pointed out, all the chemical research which they had needed had to be carried out either in other Government laboratories, not always suitable for the particular purpose, or in University institutions. The result was that the work was not co-ordinated as it should be. One of the chief objects of the Teddington laboratory was to carry out, under the general direction of the Chemistry Research Board of the Department, investigations required by other Government Departments which were of general scientific and industrial importance.

As an example of the work which was to be done, general research on the corrosion of metals was mentioned. Immense losses, it was said, were caused every year by corrosion. There would also be carried out general chemical research on the by-products of the fishing industry. It was possible to produce high-grade gelatin, and oil and fish meal, from fish residues that were at present largely wasted. This work was already in progress at the Imperial College of Science, and at Teddington would be extended. The Department further contemplated general research on chemical reactions at high pressures, a matter which was likely to become of great industrial importance.

Dr. G. T. Morgan, F.R.S., now Professor of Chemistry at Birmingham University and a member of the Dyestuffs Licensing Committee of the Board of Trade, has been appointed superintendent, and Sir Richard Threlfall, F.R.S., Director of Chemical Research to the Department, will have the general direction of the work of the new laboratory.

Death of Mr. Martin Taylor

THE death is announced, at the age of 84, of Mr. Martin Taylor, of "Abbotsmead," London Road, St. Albans. He had been connected with Brunner, Mond and Co., Ltd., since about 1882, prior to which he was in business on his own account as a chemical manufacturer. He travelled extensively abroad in the interests of the firm, and was one of the best-known figures in England and abroad in the chemical world. He was frequently consulted on matters affecting the chemical business, owing to his wide experience and sagacity. He was a personal friend of the late Sir John Brunner and the late Dr. Ludwig Mond, with whom he was closely associated in the business. He retired in 1914.

Chemistry's Relation to Agriculture

Birmingham University Lectures

In the second of the series of public lectures on "Chemistry in its Relation to Agriculture," by Mr. E. Holmes, given in the Chemistry Department of the University of Birmingham on February 11, the lecturer dealt with some colloidal properties of soils. Soil, he pointed out, consisted of a mineral framework derived by weathering from rocks, varying amounts of chalk and phosphates from marine and other organisms, a certain amount of organic matter and the soil solution. Many soil properties, such as retention of water, absorption, and so on, were accounted for by the gelatinous or colloidal coating of the individual mineral particles. This coating, once supposed to consist of aluminium or iron hydroxides, was now known to consist of an organic or humic portion, composed of a heterogeneous mixture of plant degradation products, and an inorganic portion, mainly clay.

Effects of Clay in Soils

It was now generally accepted that clay as usually met with in agricultural soils was not the simple "clay substance" of Seger, $Al_2O_3.2SiO_2.2H_2O$, but was better represented by van Bemmelen's rather elastic formula, $SiO_2.mAl_2O_3.nFe_2O_3 \ldots xH_2O$, which indicated a loose kind of hydrated chemical compound of varying amounts of aluminium and iron oxides, with other bases, combined with silica. The presence of some clay in a soil was beneficial, because it kept moisture near the plant roots, but in larger amounts it caused a soil to become water-logged in wet weather. Anything from 8 to 12 per cent. of clay was considered satisfactory in this country, although soils containing much more were used for agricultural purposes.

Clay was mainly responsible for the phenomenon of "basic exchange." It had the property of exchanging a portion of its bases with the bases of salts added to a soil in fertilisers. This accounted for the fact that potassium sulphate, as such, was not washed directly out of a soil, but the potassium was retained in a condition useful to the plant. The work and results of Hissink were outlined.

Soil Reaction

The vexed problem of soil reaction was then considered. It was shown that continued fertilisation with ammonium sulphate, of soils deficient in lime, caused the land to become sour. This was due to the fact that after hydrolysis the plant used the ammonia and left the acid in the soil. On the other hand, the continued use of sodium nitrate resulted in the production of alkalinity. Hence the terms "physiologically acid or alkaline," used in connection with the fertilisers ammonium sulphate and sodium nitrate respectively. Potassium sulphate was a less potent "physiologically acid" fertiliser than the ammonium salt, because it was less easily hydrolysed in the soil, and the plant usually needed less potash than ammonia. Relatively small changes in such factors altered the texture of a soil to a remarkable extent.

It was shown that the large amount of controversy which had resulted from the various methods of determining the so-called acidity of a soil, such as the electrometric method for p_H, the rate of inversion of sucrose, iodine liberation from KI and KIO_3, and the titration methods, was due to the fact that these methods did not give a quantitative measurement of the same qualitative effects. Hydrogen ion measurements gave a measure of the intensity of the acid present rather than the amount, while the titration methods gave the amount of acidity but did not distinguish a strong from a weak acid. The inversion method assumed the hydrogen ion to be the only agent capable of inverting sugar, and the iodine method only distinguished acidity stronger than that of HI or HIO_3. At present, and from the practical view-point, "lime requirement" was probably the best indication of what treatment a sour soil needs.

The Value of Lime

The application of lime to a soil not only counteracted acidity; it was of direct use to the plant and it improved the texture of the soil. The lecturer suggested that the cases of sour soils, reported in North Wales and on some rubber plantations in the Federated Malay States, which did not respond to liming, might be accounted for by supposing those soils to require a mixture of bases to restore their natural equilibrium, instead of an excess of one base, lime.

The lecturer closed with a discussion of the chemical formation of soil pans, the hard layers of rock which occur in some soils, and the mechanical formation of plough soles.

Refractory Materials

Paper Read Before the Institute of Metals

A paper entitled "Some Notes on Refractory Materials," was read by Mr. V. C. Faulkner (a vice-president of the Institute of British Foundrymen) at a meeting of the London Local Section of the Institute of Metals on Thursday, February 12.

The Chemical Control of Bricks

The chemical control of bricks, he said, was desirable, though the interpretation of the results obtained was often difficult, because the commonly accepted deductions failed to agree with practice. Physical tests, especially the heat conductivity, were of the most profound importance, and the results would more or less align themselves with the grain size. The smaller the grain size, the better the heat conductivity. If the exposed surface had to resist the whole of the applied heat in a furnace, and was incapable of passing any of it backwards, it was liable to fail. Expansion and contraction were other properties which should be available for the man in charge of furnace operations. They could indicate, in the case of silicas, that the brick had not been burnt at sufficiently high temperature, which was a very common fault in British practice. The laboratory should also indicate the amount which must be allowed for expansion. The imposition of pressure on most types of bricks lowered their fusing point, and certainly made them more chemically active to materials on the other side of the resultant compound. It was strongly recommended that, if it were found impossible to obtain dimensionally correct bricks from the suppliers, they should be ground to size. It might be objected that this was ridiculous, on the score of cost, but, if the furnace had to withstand really high temperatures, and an extra few days life were obtained, it was worth while. The "grinding" should be accomplished by hand-rubbing with a harder type of brick; a carborundum brick was ideal for this purpose. No rocking or rolling must ever be permitted.

In theory, acid bricks should never be in direct contact with basic, it usually being recommended that a layer of chrome bricks be used to separate them. This might be true of a 50-ton open hearth furnace, when pressure was such an important factor, but for small basic furnaces, where there were perhaps but six rows of silicas above it, the magnesite fluxing action was seldom apparent. As to dolomite, the quality of this was more dependent on the weather than on most other factors. Experiments had been made to produce a commercial dolomite brick, but without any real success. In Spain, however, owing to climatic conditions, good dolomite bricks were made in the steel works for domestic consumption. In Britain, dolomite was liable to perish during railway transit, and should invariably be riddled before use. The powder was quite useful for repairing purposes, but not for original construction.

Conclusions

The points emphasised in the paper were summarised as follows:—(1) High fusion point, apart from chemical desiderata is not the alpha and omega of a refractory material. (2) That the heat conductivity is perhaps equally important. (3) Plastic refractories suffer from this defect, and should be incorporated with refractories of better heat-conducting properties. (4) Cementing materials should be kept to a minimum, and this can only be done by insisting upon the dimensional accuracy of the bricks used. (5) That both mass and local pressure on brickwork should be kept to a minimum, the latter being also helped by dimensional accuracy of the bricks used. (6) That refractory walls should be twice coated with a refractory cement, and that a fine finish should be given so as to obtain a glaze, with the object of (*a*) exposing a minimum surface to light and heat rays, and (*b*) a material under no real pressure. (7) That British silica bricks are not burnt at sufficiently high temperature, and that as a result they expand too much on heating, which can preclude the use of plastic refractory coatings.

From Week to Week

THE ANNUAL DINNER of the Birmingham Section of the Institute of Metals was held on February 14, when Mr. W. R. Barclay presided.

DR. F. W. ASTON delivered an address to the Birmingham section of the Birmingham Association of Chemists at the University on Monday on "Atomic Weights and Isotopes."

THE WORK OF BUILDING a new block at Birmingham University for the Department of Oil-Mining is to be commenced at once. It is hoped that the department will be completed by October.

BRUNNER, MOND AND CO., LTD., at a social gathering last week presented employees who had served thirty-five and twenty-five years respectively with gold and silver watches. Nearly 3,000 watches have now been distributed.

MR. H. V. GARNER, demonstrator at the Rothamsted Experimental Station, lectured on "Farm Manure Values" at Worcester last week and outlined the chemical constituents of ideal manures for various types of land and crops.

THE GAS LIGHT AND COKE CO. has forwarded an artistic blotter printed in colours and bearing the calendar for the month in plain figures. A well mounted wall calendar with appropriate slogans for each month has also been received from the company.

CAMPHOR CULTIVATION IN SARDINIA is progressing favourably. The enterprise was only initiated last year, but crops have flourished without the aid of fertilisers. At present Italy takes annual imports of camphor from Japan amounting to about 18,000,000 lire.

MR. J. MAGIN, a director of the Co-operative Wholesale Society, speaking at Bedlington on February 14, referred to the fact that a soap factory erected by the Society during the boom period had not had a single pound of soap manufactured in it owing to the great falling off in retail demands.

THE OUTLOOK OF THE POLISH SUGAR EXPORT TRADE is very unpromising, the home requirements being less than 200,000 tons, against a production of 480,000 tons. Large quantities have, however, been sold to Soviet Russia and certain grades are finding a market in Great Britain, often replacing raffinada.

SIR THOMAS H. HOLLAND, F.R.S., has been elected president and Viscount Cowdray, Sir John Cargill, Mr. Alfred C. Adams, Mr. Alexander Duckham, Mr. Arthur W. Eastlake, and Mr. Robert Redwood have been elected vice-presidents of the Institution of Petroleum Technologists for the ensuing year.

A FIRE BROKE OUT on the premises of the Midland Oil Co., 245, Berners Street, Lozells, on Monday. Three tanks of machine oil were involved. The building was severely damaged, and firemen were hampered in their efforts to extinguish the flames owing to the presence of large stores of calcium carbide on the premises.

A SCHEME FOR MANUFACTURING POWER ALCOHOL FROM MOLASSES is receiving Government consideration in Australia. It is estimated that in the current season 400,000 tons of molasses will be produced in Queensland and Northern New South Wales, from which 26,000,000 gallons of power alcohol could be extracted. About 66,000,000 gallons of petrol to the value of £7,000,000 were imported into Australia last year.

AT THE BRITISH EMPIRE EXHIBITION this year British chemicals and allied industries will again occupy a prominent position. The display, as last year, is being organised by the Association of British Chemical Manufacturers. Special prominence will be given to dyeing. The Chemical Section will again be contained in a specially decorated chemical hall, the painted frieze of which illustrates the development of the chemical industry from the earliest days.

A VERDICT of "Accidental death" was returned at an inquest held at Birmingham on February 13 touching the death of Samuel Downing (33), analytical chemist, employed by Stewarts and Lloyds, Ltd., Halesowen, Birmingham, who died from blood poisoning. Downing was cleaning a beaker in the works laboratory when the vessel, which was cracked, broke in his hand, and he sustained a cut on the first finger of the right hand. He later developed septic-pneumonia, which was the ultimate cause of death.

ALDERMAN F. D. GIBBONS, an ex-mayor of Wolverhampton, who was for many years connected with the iron and artificial manure industries, has died, aged 87.

ARTIFICIAL COLOURING OF ORANGE SKINS has been revealed by Mr. J. F. Liverseege, Birmingham's City Analyst. A solution of chrysoidine was said to have been used to give the appearance of ripeness.

MR. AND MRS. HENRY MOND sailed from Southampton for New York in the *Berengaria* this week. They will be away from London for six weeks, during which time no correspondence will be forwarded.

FILMS ARE BEING EMPLOYED IN GERMANY to increase the use of nitrogenous fertilisers. It is claimed that it is necessary to use 30 per cent. more nitrogen in the form of Chile nitrate to produce results obtainable from German fertilisers.

A SUBSTITUTE FOR PETROL can be derived from all kinds of fatty waste, according to the claims of a Russian engineer, M. Makhonineef. The French Minister of Marine has witnessed tests and the inventor is to be given every facility for further trials.

DR. PERCY BRIGL, first assistant at the Institute of Physiological Chemistry in the University of Tübingen, has been nominated professor and director of the Institute of Agricultural Chemistry at the Agricultural Hochschule at Hohenheim.

MR. J. H. SMITH has received a presentation of a cut glass spirit tantalus and a silver cigar box from the staff of the United Alkali Co. to mark the completion of fifty years' continuous work with the firm and its predecessors. Mr. Smith started as a laboratory boy at the age of 11.

A MAN WHO WAS KILLED on Saturday, February 14, in Princes Street, Edinburgh, by a motor 'bus has been identified as Mr. J. E. Grey, of Edinburgh. Mr. Grey was agent for Baiss Brothers and Co., wholesale druggists, Bermondsey, London, and Cox and Co., manufacturing chemists, Brighton.

THE HENRY WELLS OIL CO., of 11, Haymarket, London, S.W.1, has produced an interesting "Lubrication Progress Chart," which gives at a glance a summary of lubrication progress during the years 1920 to 1924. The chart, in the form of a large blue print, will be forwarded gratis on request to interested readers.

VICKERS, LTD., have received an order for four low-temperature 4 ft. dia. by 50 ft. long fusion rotary retorts to be installed at the Burghlee Colliery at Loanhead, Midlothian. This plant, which is being manufactured at the Barrow-in-Furness works, will work on colliery waste coal for the purpose of obtaining oil and other products.

FROM AN ANONYMOUS DONOR Glasgow Technical College has received a bank draft for £50,000. Another interesting gift is from Lady Beilby, widow of Sir George Beilby, a former chairman of the College. This is a pipe organ belonging to her late husband, which Lady Beilby has offered to instal in the College Hall, paying the expenses of the installation, amounting to £700.

LECTURING on "Iron in Antiquity" before the Birmingham and Midland Section of the Society of Chemical Industry, on February 12, Dr. J. Newton Friend said that bronze instruments were used by man long before he realised they were alloys, and we knew that other metals were appreciated even in the Stone Age. The Romans were skilled metallurgists, and were actually the first to prepare cast-iron.

THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE recently entered into arrangements with the Government of Southern Rhodesia for the development of research work in that country, and has appointed, for a term of three years, Dr. G. R. Ross, M.B., Ch.B., D.P.H., Ph.D., to be Rhodesian Research Fellow. Dr. Ross is at present lecturer in bacteriology in Leeds Univer[illegible] He will proceed to Salisbury, Southern Rhodesia, early in March.

THE MOND NICKEL CO. is building a contact sulphuric acid plant at its smelter at Coniston, Ontario, as an extension of its metallurgical operations. The plant will be of the most modern design and will produce, for the Canadian market, sulphuric acid of the highest quality and of all strengths. It is intended to begin production in the latter part of 1925. This development is unique in acid production in Canada, as it is understood that the source of SO_2 will be the furnaces producing nickel matte from sulphur-nickel-copper ores.

(*Continued on page* 181)

(*Continued from page* 180)

A DISCUSSION ON REMEDIES FOR GAS POISONING IN MINES took place on Monday at the meeting of the South Staffordshire and Warwickshire Institute of Mining Engineers. Practical aspects of the subject and experiences of members were debated, and a demonstration or experiment under test conditions of the respirators and absorbers was suggested. The President said that the subject was one of great interest to mining engineers, and anything that could be done towards increased safety in the mines must be welcomed by all connected with the industry.

THE ANNUAL EXAMINATIONS for a "Faraday" scholarship of fifty guineas per annum, tenable for two years in college and one year in manufacturing works, and for a "Maxwell" scholarship of fifty guineas per annum, tenable for one year at college and one year in works, will be held at Faraday House, on April 7, 8 and 9. Exhibitions may also be awarded to candidates who acquit themselves creditably, but who do not obtain the necessary number of marks to qualify for the Faraday or Maxwell scholarship. Particulars may be obtained from the secretary, Faraday House, 62–70, Southampton Row, London, W.C.1.

THE BADISCH ANILINE UND SODAFABRIK is negotiating with the Norsk Hydro with a view to the resumption by the latter of the manufacture of nitrogen, according to *Journie Industrielle*. The factory belonging to the Norsk Hydro, which was installed with the collaboration of the Badische Anilinfabrik, used the Eyde process of manufacture, which has now been superseded by the German methods. Since, however, the Norsk Hydro has at its command a large and cheap hydraulic force, an inquiry is now taking place as to the possibility of reorganising the production at the works. The German company appears to be endeavouring to regulate the nitrogen market, for it exports a considerable amount.

THE PERKIN MEDAL, awarded annually by the American Chemical Society to "the American chemist who has most distinguished himself by his services to applied chemistry," was presented on January 16 to Mr. Hugh Kelsea Moore, technical director of the research laboratory of the Brown Co., Berlin, N.H. Mr. Moore's investigations have related to the electro-chemical decomposition of salt into chlorine and caustic soda, the production of wood pulp, the hydrogenation of oils, and the production of a variety of organic and inorganic products. The production of chlorine and caustic soda by the Allen-Moore cell, the design of multiple-effect evaporators, and the design of apparatus for many continuous process are among his engineering successes.

THE REPORT OF THE PRELIMINARY INQUIRY, under the Boiler Explosions Act, into the explosion from a tar pre-heater at the chemical works of Joseph Turner and Co., Ltd., of Queen's Ferry, Chester, on February 12, has now been published. The explosion, which resulted in the death of a boilerman, is stated to have been caused by the pre-heater being subjected to a greater pressure than the working pressure. The report (No. 2,689) can be obtained from H.M. Stationery Office, Adastral House, Kingsway, London, W.C., and should prove of particular interest to those concerned with similar processes, as it gives full descriptions and diagrams of the plant and outlines practical precautions.

THE MELDOLA MEDAL FOR 1924 has been awarded to Dr. Leslie J. Harris, Ph.D., of the Cambridge University School of Biochemistry, by the Institute of Chemistry. The medal is awarded to the scientist who is considered to have made the most important advance in the science of chemistry under the condition that the recipients must have been engaged upon such work when still 30 years of age or under. Dr. Harris, who is 26 years of age, has been a frequent contributor to the Proceedings of the Royal Society, and is the author of a large number of publications on scientific and medical subjects. His investigations have dealt largely with the physical chemistry of the proteins and their components ("amino-acids"), and he has devised methods whereby these bodies may be analysed, and has shown them to contain unknown constituents. Dr. Harris has also introduced new analytical methods which have proved of general application in chemistry, and can be used in the case of substances hitherto considered impossible of estimation by such means. The public presentation of the medal will take place in London on March 2.

Chemical Matters in Parliament

Coal Industry (Oil Production)

VISCOUNT SANDON (House of Commons, February 10) asked the Secretary for Mines to what extent, if any, oil was being extracted from coal in this country; and whether, in view of its success in other countries and of the remarkable estimates of production made by experts in this country, steps could be taken to encourage such works.

Lieut.-Colonel Lane-Fox stated that considerable quantities of tar oil, creosote, etc., were extracted from coal incidentally to the manufacture of gas and coke by processes of high temperature carbonisation. But referring to the extraction of oil from coal by processes of low temperature carbonisation, such processes were not at present operated on any large scale, and consequently the quantity of oil extracted by them was negligible. Considerable advance had, however, been made in recent years on an experimental plane, and it was hoped that in time one or more processes might be established on a firm commercial basis. His Majesty's Government had for some years past been conducting experiments at the Government Fuel Research Station and publishing the results. In order to assist private investigators in getting their processes, if promising, adopted on a commercial scale, they recently offered to test, free of cost, any experiemntal plant and process which appeared likely to give reasonably good results under normal working conditions, and use was already being made of this offer.

Industries (Subsidies)

The Prime Minister (House of Commons, February 11), in replying to a question stated that it was not the intention of the Government to subsidise, out of the public purse, any industries other than that of beet sugar.

British Dyestuffs

In reply to Mr. Waddington (House of Commons, February 17), who asked whether, as the capital of the British Dyestuffs Corporation was over £9,000,000, and the annual value of its sales did not exceed £4,000,000, he would instruct the directors appointed by the Government to press for an immediate financial reconstruction to enable the corporation to sell its productions at competitive prices.

Sir P. Cunliffe-Lister said he was not aware that the reconstruction of the capital of the British Dyestuffs Corporation would affect the selling prices of its products, but he knew that this matter was having the careful attention of the directors, and His Majesty's Government had already informed them that the Government were prepared to participate in a reconstruction of capital.

A New American Germicide

THE Johns Hopkins School of Hygiene and Public Health (a New York *Times* correspondent states) announces the discovery of a chemical compound which kills all germs in the kidneys and urinary tract and which, while 50 times more potent than carbolic acid, is harmless to the human system. Hexylresorcinol, as the new agency is called, was found as the result of 10 years' research by Dr. Veader Leonard, chairman of the clinical committee on internal antisepsis of the National Research Council, in co-operation with Dr. Treat B. Johnson, Professor of Organic Chemistry at Yale University.

A few months ago experiments made by Dr. Leonard in the Johns Hopkins laboratories showed such happy results upon rabbits that he and six of his assistants were convinced that the new preparation was harmless to everything but disease germs. They began taking daily doses of it, steadily increasing the amount to determine its effect on the human body. When they were sure it had no ill-effect they applied the antiseptic for the first time to the treatment of disease. The results were remarkable. In some cases infections of the kidneys of long standing were cleared up in 48 hours. The cures appeared to be permanent, and there were no signs that the patients had been harmed in any way. Whether hexylresorcinol is effective in treating other types of disease Dr. Leonard is not yet prepared to say in the absence of sufficient data. But the National Research Council has appointed a committee of 15 to work with him in further researches in order to determine the scope of the application of this germicide to disease in general. The preparation is being sent to a number of hospitals and medical schools for experiment.

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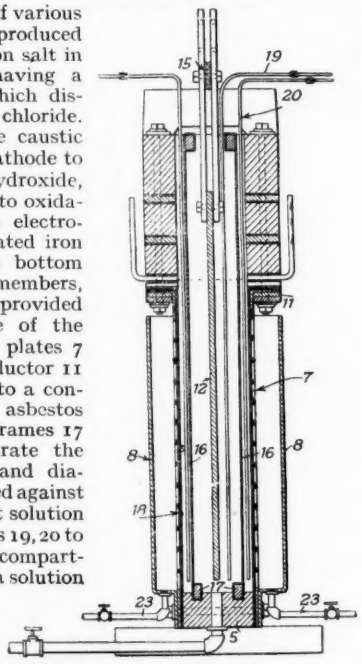
Abstracts of Complete Specifications

227,319. Iron Oxide Pigments, Electrolytic Process for Preparing. H. G. C. Fairweather, London. From Magnetic Pigment Co., 41, East 42nd Street, Manhattan, New York. Application date, March 31, 1924.

Iron oxide pigments of various shades can be cheaply produced by decomposing common salt in an electrolytic cell having a soluble iron anode, which dissolves to form iron chloride. This is mixed with the caustic soda produced at the cathode to precipitate ferrous hydroxide, which is then subjected to oxidation. The sides of the electrolytic cell are of perforated iron plates 7 bolted to the bottom members 5 and the end members, and outer plates 8 are provided to prevent the escape of the caustic solution. The plates 7 are connected to a conductor 11 and the iron anode 12 to a conductor 15. Sheets of asbestos paper 16 mounted on frames 17 are employed to separate the anode and cathodes, and diaphragms 18 are supported against the plates 7. The salt solution is supplied through pipes 19, 20 to the inner and outer compartments. The caustic soda solution is withdrawn continuously through pipes 23 as it trickles over the outer faces of the cathodes 7, and the ferrous chloride through a pipe not shown. The two solutions withdrawn are mixed to precipitate ferrous hydroxide, and the sodium chloride may be used again.



227,319

227,481. Alphanaphthylamine, Process for the Preparation of. G. Poma and G. Pellegrini, Cesano Maderno, Milan, Italy. Application date, August 27, 1923.

This process is for preparing α-naphthylamine by the reduction of α-nitronaphthalene. The latter is mixed with a catalyst and water, and treated with a gaseous reducing agent in the absence of air. The reaction vessel is capable of withstanding a pressure of several atmospheres, and is provided with means for heating it and with a stirrer. The catalyst may be finely divided nickel, cobalt, copper, or iron) or one of their oxides, and it may be supported on an inert substance such as charcoal, pumice, quartz, etc. The proportion of catalyst is about 0·5 per cent. of the weight of α-nitronaphthalene. The reduction is effected with hydrogen or water-gas at a pressure of 4–5 atmospheres, and temperature of 50°–60° C. The α-naphthylamine remains molten, and is filtered from the catalyst. The product is of 97–99 per cent. purity. Reference is directed in pursuance of Section 7, Sub-section 4 of the Patents and Designs Acts of 1907 and 1919, to Specifications No. 135,510 and 16,936/1913.

227,491. Catalysts for the Synthesis of Ammonia, Production of. L. Casale, 9, Via del Parlamento, Rome, Italy. Application date, September 20, 1923.

These catalysts are obtained by heating artificial or natural oxides of metals of the iron family, including iron, cobalt, nickel, manganese, chromium, molybdenum, tungsten, and uranium, with substances possessing a high combination heat with oxygen which are not catalytic poisons, such as carbon, magnesium, aluminium, or calcium. A non-reducible metal oxide such as those of the alkaline earth metals may also be added. The latter oxides may be added as such or in the form of the metals, and the oxidation of the latter assists in obtaining the high temperature necessary in the operation. In an example, a mixture of powdered magnetite 85 parts, and calcined dolomite 15 parts, is placed at the bottom of a long crucible in which a sheet iron cylinder is placed vertically. This mixture is also packed in the space between the cylinder and the crucible wall, and the cylinder itself is filled with a mixture of magnetite 65 parts, carbon 31 parts, and aluminium, calcium, or magnesium 4 parts. Combustion is started at one point, and is continued by passing oxygen upwards through the mixture. The mixture melts and then boils, and finally becomes pasty when the reaction is finished. The mixture is then cooled and disintegrated. The resultant catalyst contains the non-reducible oxides uniformly distributed in it, these oxides having the property of increasing the catalytic activity of the metals.

227,631. Base Exchanging Substances for Softening Water and Removing Iron and Manganese therefrom, Process for Producing. V. Kobelt, 128, Hohenzollernstrasse, Munich, Bavaria. Application date, January 23, 1924.

It has been found that an efficient base-exchanging substance may be obtained from clay or bricks which have been burnt at a comparatively low temperature, by granulating and then treating with concentrated hydrochloric acid. In an example, brick which has been burnt at 500°–700° C. is broken into particles of 1–1·5 mm. size, and treated with hydrochloric acid of 30 per cent. concentration for about 2 minutes. The material is then washed until neutral to litmus and the product is found to have base-exchanging properties for lime and magnesia up to 0·17 per cent. An example is given in which 630 grams of this base-exchanging material absorbed 1·08 grams of calcium oxide and magnesia, and thereby reduced the hardness to 0°. The material can be regenerated with a 10 per cent. solution of salt, and the operations may be repeated indefinitely.

An efficient base-exchanging material may also be obtained if the raw material is treated with dilute acid, followed by a treatment with basic salts. In an example the granulated material is digested with hydrochloric acid of 1 per cent. strength for 15–20 minutes at boiling point. The material is then washed with water until neutral, and then boiled for 3–4 hours with caustic soda solution containing 1 per cent. sodium oxide. The material is then washed with water until neutral, yielding a base-exchanging substance having an exchanging co-efficient of 0·2 per cent. Instead of employing caustic soda solution in the above process, ammoniacal calcium chloride may be used, and it may be allowed to stand in contact with the substance instead of boiling.

227,660. Separation of Lead and Zinc in Roasted Compound Ores, Process for. A. Nathansohn, Goslarischestrasse 6, Bad Harzburg, Germany. Application date, February 28, 1924.

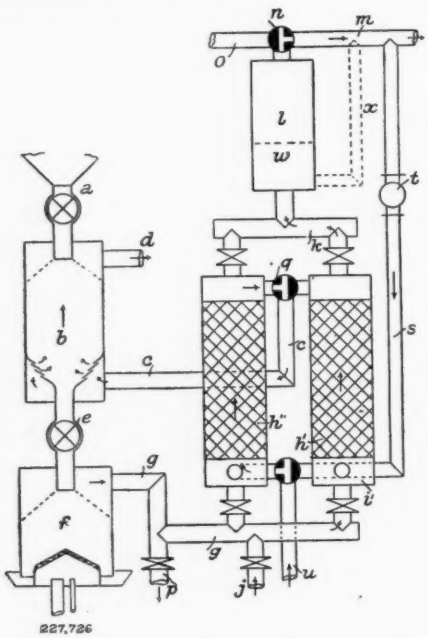
In the recovery of lead and zinc from roasted complex ores, it is an advantage to recover the lead without first converting the zinc into soluble form, if cheap electrical power is not available for recovery of the zinc from its solution. The lead in such roasted ore is present mainly as a basic sulphate, which is not readily dissolved by solutions of sodium chloride. If the roasted ore is first treated with acid, sodium chloride will dissolve about 90 per cent. of the lead, but in the absence of this preliminary treatment only about 25 per cent. of the lead is dissolved. According to this invention, the lead contained in complex ores roasted in the usual manner can be dissolved out from the zinc by means of highly concentrated solutions of chlorides of the alkaline earth metals and magnesium, *i.e.*, a concentration exceeding 200 grams of chlorine per litre. The waste liquor resulting from the manufacture of potassium chloride from carnallite, and which contains about 250 grams of chlorine per litre is suitable. This solution dissolves practically all the basic lead sulphate, but not the zinc. The lead chloride may be recovered by cooling, or the lead can be obtained electrolytically or by cementation, *e.g.*, on iron. The waste liquor from which the lead has been extracted contains some magnesium sulphate from the reaction between the lead sulphate and magnesium chloride, and if used several times for treating the ore, becomes enriched with so much sulphuric acid that the solvent capacity for lead is reduced. This difficulty can be avoided if the

liquor is still more concentrated so that it contains more than 280 grams of chlorine per litre. The solubility of magnesium sulphate in this liquor is reduced to 2–3 per cent. sulphuric acid, which does not affect the solvent capacity for lead, so that the liquor may be used repeatedly.

At first some of the zinc is dissolved, but it remains in solution during the recovery of the lead. This liquor when used again for treating fresh ore dissolves practically no more zinc. Any zinc in the solution can ultimately be recovered by diluting and precipitating with lime. The residual cake still contains some chlorine as zinc oxychloride. This may be removed by agitation with water containing the corresponding quantity of lime, leaving a satisfactory metallurgical zinc product. Any silver present in the ore is partly dissolved in the magnesium chloride liquor, and another portion may be dissolved by adding an oxidising agent such as bleaching powder, bromine, persulphates, permanganates, or peroxides. The dissolved silver may be precipitated with zinc dust or iron powder.

227,726. Complete Gasification of Fuel and Production of High-Grade Gas. J. Rude, 27, Clanricarde Gardens, London, W.2. Application date, June 27, 1924. Addition to 218,925.

Specification No. 218,925 (see The Chemical Age, Vol. XI, p. 196) describes a process for completely gasifying solid fuel, partly in an internally heated retort, and partly in a water-gas



227,726

producer. In this invention, improved apparatus is provided for transmitting the heat from the blow gases or their combustion gases to the gas which serves as a heating fluid in the retort. Fuel is supplied through a valve *a* to a retort *b*, where it is internally heated by gas from regenerators *h'* or *h''*, which enters through the pipe *c*. The gas and distillation products pass out through the pipe *d* to the cooling and cleaning plant. The coke passes downwards through a valve *e* to a producer *f*. During the blow period, the gas passes through the pipe *g* to one of the regenerators, *e.g.*, *h'*, where it is partly or wholly burned in the combustion chamber *i'* by air admitted through *j*. After heating the regenerator, the gas passes through a pipe *k* to a waste heat boiler *l*, and thence through a pipe *m* to the outlet.

The water-gas produced may follow the route of the blow gas to the boiler *l* and thence through valve *n* and pipe *o* to the scrubber. Alternatively, the water-gas may be immediately drawn off through the pipe *p*. Alternatively the water-gas may be led directly into the retort *b* to heat it, or it may pass first through the regenerator and thence by valve *q* and pipe *c* to the retort *b*. In the two latter alternatives, the boiler *l* is heated only by the blow gas, and to compensate for this, a circuit of gas may be formed from the flue *m* through the pump *t* and pipe *s* to the regenerators. This flow of gas may be intermittent during the gas-making period, or continuous. A supplementary combustion chamber *w* may be provided for the blow gas. While the regenerator *h'* is being heated, gas for heating the retort *b* is passed through the pipe *u* and regenerator *h''* to the pipe *c*. If a rotary retort is employed, it may be combined with several producers, but only one pair of regenerators may be used. The water-gas may be combined with the distillation gas, and after cleaning and removal of surplus, is returned through the pipe *u*. When the water-gas passes straight to the regenerators for heating during gas-making periods, the auxiliary gas which effects this object during blow periods may consist of returned or circulating gas.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention: 200,834 (L. Lilienfeld) relating to preparation of cellulose derivatives, see Vol. IX, p. 320; 207,791–2 (L. Deutsch, I. Thorn, and Amalith Chemische Industrie Ges.) relating to production of hard, insoluble, infusible products from phenols and aldehydes, see Vol X, p. 147; 213,561 (W. R. Wade and New York Zinc Co., Inc.) relating to methods of dehydrating minerals, see Vol. X, p. 578; 213,914 (Fabrique de Soie Artificielle de Tubize Soc. Anon.) relating to production of concentrated acetic acid, see Vol. X, p. 629; 218,237 (Ammonia Casale Soc. Anon.) relating to catalysts for the synthesis of ammonia, see Vol. X, p. 222.

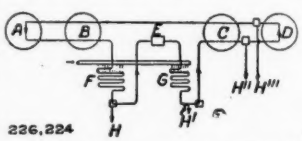
International Specifications not yet Accepted

226,217. Alkali Tungstates, Vanadates, and Molybdates. British Thomson-Houston Co., Ltd., Crown House, Aldwych, London. (Assignees of A. Pacz, 1833, Grasmere Avenue, East Cleveland, Ohio, U.S.A.). International Convention date, December 14, 1923.

An ore or crude compound of tungsten, vanadium or molybdenum is fused with an alkali nitrite to obtain a soluble compound such as the tungstate. Soluble compounds are not formed with the silica or iron. Wolframite may be treated in this manner to obtain sodium tungstate solution, from which tungstic acid is obtained.

226,224. Ammonia Synthesis. Synthetic Ammonia and Nitrates, Ltd., Billingham, Stockton-on-Tees, Durham. (Assignees of W. H. Kniskern, Syracuse, N.Y., U.S.A.) International Convention date, December 13, 1923.

Gases from the synthesiser A pass through the heat interchanger B, and then through cooling coils F, G, before reaching the cold interchanger C. The coils F, G are cooled by air or water, and a circulating pump E is placed between them. The ammonia is then condensed in the liquefier D, and is drawn off from the system at H, H', H'', H'''. The consumption of energy in the liquefier D is reduced by the use of the coils F, G.



226,224

226,490–1. Silicofluorides, Borofluorides and other Complex Fluorine Salts. A. F. Meyerhofer, 10, Goethestrasse, Zurich, Switzerland. (Assignees of E. De Haen Akt.-Ges., Seelze, near Hanover, Germany.) International Convention date, December 20, 1923.

226,490. Silica is treated with a fluoride in presence of an acid to obtain salts of hydrofluosilic acid; or silicon fluoride, a metal fluoride, and a salt of the metal of which the silicofluoride is required, in presence of an acid. Salts of other complex fluorine acids are obtained by replacing the silica by the metal or non-metal oxide of the complex acid or by the fluoride, these being used with hydrofluoric acid or an insoluble fluoride.

Examples are given of the production of potassium silicofluoride from (1) potassium fluoride, silica, and hydrochloric acid, (2) potassium fluoride, silica, calcium fluoride and hydrochloric acid, (3) potassium chloride, silica, calcium fluoride and hydrochloric acid, (4) potassium chloride, silicon fluoride, calcium fluoride, and a small quantity of an acid, (5) potassium silicate, calcium fluoride, and hydrochloric acid. Also the production of magnesium silicofluoride, sodium borofluoride, and potassium borofluoride.

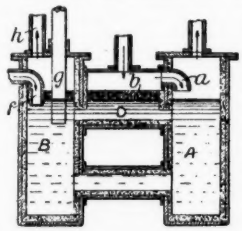
226,491. Metallic salts are obtained by treating the metal or its oxide, carbonate, or soluble salt with hydrofluosilicic or hydrofluoboric acid, the product being treated with another salt to obtain the desired metallic salt. The complex fluorine salt remaining is treated with sulphuric acid to recover the corresponding acid. Zinc oxide is treated with hydrofluosilicic acid, and the resulting silicofluoride with sodium chloride to obtain zinc chloride and sodium silicofluoride. Hydrofluosilicic acid may be recovered from the latter by treating it with sulphuric acid, or it may be converted into sodium fluoride and silicon fluoride by heat. The sodium fluoride may be treated with calcium carbonate to obtain sodium carbonate, and the resulting calcium fluoride is treated with silicon fluoride and an acid to obtain hydrofluosilicic acid. Alternatively, the sodium silicofluoride may be directly treated with calcium carbonate to obtain sodium carbonate and the remaining calcium silicofluoride treated to obtain hydrofluosilicic acid. Zinc chloride may be treated with hydrofluosilicic acid and sodium chloride to obtain sodium silicofluoride.

226,492. PERYLENE. Compagnie Nationale de Matières, Colorantes, et Manufactures de Produits Chimiques du Nord, Réunies Etablissements, Kuhlmann, 134, Boulevard Haussmann, Paris. International Convention date, December 20, 1923. Addition to 208,721. (See THE CHEMICAL AGE, Vol. X., p. 202.)

Perylene is obtained from a halogen-phosphoric ester or a phosphorous or chlorophosphorous ester of β-naphthol or a derivative. These esters are obtained by the action of phosphorus halide or oxyhalide on β-dinaphthol. In an example, perylene is obtained by distilling β-dinaphthol chlorophosphoric ester alone or with zinc dust or zinc chloride. Alternatively, β-dinaphthol phosphoric ester or chlorophosphorous ester is heated with zinc chloride and zinc dust. In another example, chlorine is passed through β-dinaphthol chlorophosphorous ester dissolved in carbon tetrachloride, yielding trichlorophosphoric ester, which is distilled with zinc chloride and zinc dust.

226,500. CARBON MONOXIDE AND HYDROGEN. K. Michalski, 55, Klosterallee, Hamburg, Germany. (Assignee of L. Kropp.) International Convention date, December 17, 1923.

Carbon monoxide is obtained by oxidising carbon with molten ferrous oxide, and hydrogen is obtained by the action of superheated steam on molten iron. Iron is liquefied in a generator B, and superheated oxygen is passed into it from a pipe *f*, producing ferrous oxide. A rod *g* of ground coke agglomerated with clay or pitch reacts with the ferrous oxide, and the carbon monoxide escapes by the pipe *h*. Steam is passed into the hydrogen generator A through the pipe *a*, and is superheated by passing over the iron in the passage D. This iron is covered by slag *b* so that the steam does not react with it.



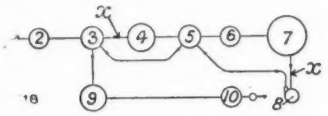
226,500

226,512. DEOXIDISING COMPOSITIONS. Metropolitan-Vickers Electrical Co., Ltd., 4, Central Buildings, Westminster. (Assignees of A. H. Maude, 1113, Walnut Street; C. J. Rodman, 422, Holmes Street; C. A. Styer, 1300, Singer Place, all in Wilkinsburg, Pa., U.S.A.; and W. C. Wilharm, 129, Gordon Street, Edgewood, Pa., U.S.A.) International Convention date, December 21, 1923.

Oxygen is removed from gases by a mixture of an electrolyte and a metal in molecular proportions, with or without other additions such as water, inert porous substances, *e.g.*, kieselguhr, silica, cork dust, asbestos, sawdust, activated carbon or other catalyst, and calcium chloride. As an example, copper oxide scale is ground, mixed with kieselguhr, and reduced. It is then mixed with ammonium chloride, calcium chloride, water, and activated carbon in an atmosphere of nitrogen or carbon dioxide.

226,518. SULPHURIC ACID. General Chemical Co., 40, Rector Street, New York. (Assignees of C. B. Clark, 40, Rector Street, New York.) International Convention date, December 21, 1923.

The contact process is conducted in two or more stages. Gases from a sulphur burner 1 and combustion chamber 2 pass through a heat interchanger 3 to a series of converters 4, where they interact. The reaction gases pass through another heat interchanger 5 to an absorber 6 and filter 7. The gases,



still containing 30 per cent. of sulphur dioxide, pass through a blower 8 to the heat interchangers 5, 3, where their temperature is raised, and then to another converter 9. The trioxide is then removed in the absorber 10. Air may be added at the points *x*.

LATEST NOTIFICATIONS.

228,863. Process for the manufacture of malonic acid esters. Soc. Chimique des Usines du Rhône. February 7, 1924.

228,913. Process for producing azo-dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning. February 8, 1924.

Specifications Accepted with Date of Application

213,252. Charcoal of high decolorising power, Process for the manufacture and regeneration of. J. Perten. March 19, 1923.

228,220. Water-soluble phosphates, Manufacture of. J. G. Williams and J. T. Millar. September 28, 1923.

228,231. Compressed gas, Process for the production of—by electrolysis. P. Hausmeister. October 23, 1923.

228,244. Crude oxide and carbonate of zinc, Process for treating. W. T. Gidden, W. G. Ragg, and Chance and Hunt, Ltd. October 29, 1923.

228,259. Base-exchanging bodies, Regeneration of. United Water Softeners, Ltd., and S. V. H. Lassen. October 31, 1923.

228,301. Volatile substances, Process of concentrating aqueous solutions of. F. E. Lichtenthaeler. December 4, 1923.

228,348. Viscose, more particularly for the manufacture of artificial silk, Process for the purification of. P. Bader, H. Eggert, A. Wagner. February 9, 1924.

228,390. Soaps and detersive preparations, and Process for the manufacture thereof. R. Vidal. April 1, 1924.

228,459. Soaps and other saponaceous compounds, detergents, bleaching compounds and the like. Patent Borax Co., Ltd., and J. S. Morgan. August 20, 1924.

Applications for Patents

Akt.-Ges. für Anilin-Fabrikation and Bloxam, A. G. Manufacture of sulphide dyestuffs. 3,760. February 10.

Algemeene Norit Maatschappij and Potts, H. E. Production of active carbons. 3,657. February 9. (February 22, 1924.)

Algemeene Norit Maatschappij and Potts, H. E. Production of active carbons. 3,658. February 9. (May 9, 1924.)

Anderson, J., British Alizarine Co., Ltd., and Dawson, W. H. Manufacture of benzanthrone derivatives. 3,671. February 10.

Badische Anilin-& Soda-Fabrik, and Johnson, J. Y. Manufacture of black vat dyestuffs. 3,948. February 12.

Chemische Fabrik vorm. Sandoz. Preparation of ureides of perhydrogenated aromatic and fatty aromatic carboxylic acids. 4,187. February 14. (Switzerland, March 10, 1924.)

Chemische Fabriken vorm. Weiler-ter Meer. Manufacture of ethyl chloride. 4,194. February 14. (Germany, June 12, 1924.)

Ellis, G. B., and Torsion Balance Co. Balances, etc. 3,877. February 11.

Farbenfabriken vorm. F. Bayer and Co. Manufacture of azo dyestuffs. 4,106. February 13. (Germany, February 13, 1924.)

Hepburn, G. G. Process for softening water. 3,558. February 9.

Pieters, J. Apparatus for distillation of tar or oils. 3,837. February 11. (France, February 12, 1924.)

Pontoppidan, C. Manufacture of cement. 3,888. February 11. (Denmark, June 5, 1924.)

Rhenania Verein Chemischer Fabriken Akt.-Ges. Manufacture of chlorine. 4,120. February 13. (Germany, February 15, 1924.)

Richardsons, Westgarth, and Co., Ltd. Means for preventing, etc., scale on heating surfaces. 3,746. February 10.

Richardsons, Westgarth, and Co., Ltd., Centrifugal pump. 3,747. February 10.

Slade, R. E. Production of pure carbon. 4,130. February 14.

Suida, H. Manufacture of ethyl chloride. 3,756. February 10. (Austria, February 11, 1924.)

Synthetic Ammonia and Nitrates, Ltd. Production of pure carbon. 4,130. February 14.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, February 19, 1925.

A FAIR demand has been received during the past week and business in some directions is better. Export trade from some markets has improved and a fair amount of inquiry is being received.

General Chemicals

ACETONE continues in fair request, price being steady at £78 per ton.

ACID ACETIC is in normal every-day request, price showing no change at £41 per ton for technical 80% and £42 per ton for pure 80%.

ACID CITRIC is in demand for forward and price is firm at 1s. 5d. per lb.

ACID FORMIC is in rather smaller request, price without change at £52 per ton for 85% technical ex wharf, duty paid.

ACID LACTIC.—Business has been satisfactory and price is firm at £43 per ton for 50% by weight.

ACID, OXALIC.—Makers' prices are reported to have advanced. Demand continues to improve.

ACID TARTARIC.—For forward delivery prices are slightly higher and spot prices show a firmer tendency.

ARSENIC still remains a very weak market and business has only been of small dimensions.

BARIUM CHLORIDE.—Lower prices are being offered from the continent and demand has slackened somewhat.

COPPER SULPHATE continues in fair request, with no quotable change in price.

CREAM OF TARTAR has been in better demand, price round about £77 per ton.

EPSOM SALTS.—A large amount of business has been transacted and an advance is not unlikely.

FORMALDEHYDE.—Demand still remains very poor but makers are not willing to make further concessions. Spot price remains at £43 to £44 per ton, ex wharf.

LEAD ACETATE.—A fair amount of business has been transacted and price keeps steady at £46 10s. to £47 for white and £44 to £45 for brown.

LEAD NITRATE is unchanged.

LIME ACETATE has been in good request and price is firm at about £14 10s. per ton, basis 80%.

CAUSTIC POTASH.—Prices in this country are easier and demand still below normal.

CARBONATE OF POTASH is unchanged.

CHLORATE OF POTASH has been an interesting market with a large amount of enquiry for export and prices are firmer.

PERMANGANATE OF POTASH.—Stocks are not heavy and a fair amount of business has been transacted at recent figures.

PRUSSIATE OF POTASH continues very scarce and manufacturers are still well sold for the next few months. Price firm at 8d. to 8½d. per lb.

SODIUM ACETATE has been in better request with price steady at £22 5s. to £22 15s.

SODA HYPOSULPHITE.—Both Commercial and Pea Crystals have been in satisfactory demand.

SODA PRUSSIATE.—The market is a shade easier, although demand still continues active.

Coal Tar Products

There is no change to report in the market for coal tar products from last week.

90% BENZOL remains scarce, and is still quoted at 1s. 10d. to 1s. 10½d. per gallon on rails.

PURE BENZOL also remains unchanged at about 2s. per gallon on rails.

CREOSOTE OIL is quoted at from 6½d. to 6¾d. per gallon on rails in the North, while the price in London is 7½d. to 7¾d. per gallon.

CRESYLIC ACID is in poor demand, and is offered at 1s. 10d. per gallon on rails in bulk for the Pale quality 97/99%, while the Dark quality 95/97% is quoted at 1s. 7d. to 1s. 8d. per gallon.

SOLVENT NAPHTHA is unchanged at 1s. 4d. to 1s. 4½d. per gallon on rails.

HEAVY NAPHTHA is worth 1s. 1d. to 1s. 2d. per gallon on rails.

NAPHTHALENES are still very quiet, the lower grades being quoted at from £4 5s. to £4 15s. per ton. The higher quality 76/78 is quoted at £6 to £6 10s. per ton, and the 74/76 quality at £5 10s. to £6 per ton.

PITCH remains quiet owing to the continued poor demand from abroad. Prices in this country however remain unchanged at approximately 40s. to 45s. f.o.b. London, and 40s. to 42s. 6d. f.o.b. East and West coast ports.

Nitrogen Products Markets

Export.—During the past week, the demand for export has continued steadily, and producers are disposing of all available supplies at about £13 15s. per ton f.o.b. It is expected that the export demand for the remainder of this season will be supplied at about this figure, though it is possible that the price will have to be raised slightly.

Home.—The home demand for the first half of February was distinctly disappointing, but this was inevitable when the wet condition of a large part of the country is considered. The result of this is that the home sales for the present season are now slightly above those of last year, instead of the large increase of 12,000/15,000 tons, as reported earlier in the year. However, it is expected that the season will be a late one, and that the home consumption will be about 10,000/15,000 tons above that of last year.

Nitrate of Soda.—The nitrate of soda market continues weak. Producers are still holding for the same price as reported last week; little business is resulting. Buyers tend to hold off on account of an expected fall in prices. It is expected that the stock in Europe cannot be consumed without a reduction. On the other hand, the American consumption continues to be satisfactory.

The German Chemical Market

(FROM A CORRESPONDENT.)

BUSINESS was limited last week, and quantities ordered by customers were insignificant. As far as possible orders were carried out, in spite of the extremely low prices, in order to maintain connections. The uncertain situation of the market caused further offers in caustic potash, which were made on a basis of $14.50 for larger quantities. Caustic soda packed in 50 kilo drums was somewhat in demand. Offers of £17 were on the market for this kind of package. Some transactions were brought to a close in Epsom salts, and £2 17s. 6d. were paid for lots of 50 tons. The market for sugar of lead has become unsettled, as this product is dependent on the quotations of lead. The prices of dealers were much lower than those of the works, and trade was done on a basis of £45. Chloride of potash for immediate shipment remains in demand, transactions were carried out at $10.50. Chloride of calcium was in strong demand for spring shipment, making it possible to place it for larger quantities at £3 7s. 6d. Oxalic acid is in demand in small parcels for prompt shipment, whilst the market gives no clear view for later deliveries. Business was done at £22 5s. Sulphate of sodium was further traded on a basis of £10 for prompt delivery. A rise in the price of permanganate of potash may be expected, as attempts were made in the last few days to buy up important quantities. At present it offers at £48. $10.60 was paid for carbonate of potash by a minimum order of 10 tons.

American Market Movements

(From *Drug and Chemical Markets.*)

INDUSTRIAL chemicals show little change. Contract business good. Spot orders small. Barium chloride continues to become firmer. Sodium acetate higher. Toluene very firm and scarce on spot. Benzene easy. Solvent naphtha quite steady. Pyridine higher. Monosulphonic and para-nitroaniline and R-salt lower.

Fine chemicals are quiet. Menthol, imported bromides, and antipyrine are lower. Essential oil market is again featured by sharp rise in oil peppermint. Oil cassia easier. Oil sandalwood higher.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at retailers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£21 to £23 per ton.
Acid Boric, Commercial.—Crystal, £45 per ton, Powder, £47 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d.; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chloride (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 7d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d. Normal business.
Nickel Ammonia Sulphate.—£38 per ton d/d. Normal business.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5½d. per lb.
Potassium Chlorate.—3d. to 4d. per lb.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4½d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 to £18 per ton, according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—2½d. to 3½d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphide conc. solid. 60/65.—About £15 per ton d/d. Contract £14 15s. Carr. pd.
Sodium Sulphide Crystals.—£9 5s. per ton d/d. Contract £9 2s. 6d. Carr. pd.
Sodium Sulphide, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—5½d. per lb. Slightly better demand. Crude 60's, 1s. 7d. to 1s. 8d. per gall. Little demand.
Acid Cresylic 97/99.—1s. 9d. to 2s. per gall. Pale, 95%, 1s. 7d. to 1s. 10d. per gall. Dark, 1s. 7d. to 1s. 10d. per gall. Markets weaker, little demand.
Anthracene Paste 40%.—4d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7d. to 8d. per gall. Unstrained, 6d. to 7d. per gall.
Benzol.—Crude 65's.—9d. to 11½d. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 1s. 11d. per gall., ex works in tank wagons. Supplies very scarce.
Toluol,—90%, 1s. 7d. to 1s. 7½d. per gall. More inquiry. Pure, 1s. 11d. to 2s. per gall. Steady demand.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. to 9d. per gall. Better demand. Middle Oil, Heavy, Standard specification, 6d. to 7d. per gall., according to quality and district. Market firmer. Steady demand.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 3d. to 1s. 7d. per gall. Demand good. Solvent 90/190, 11½d. to 1s. 1d. per gall. Steady business.
Naphthalene Crude.—Demand rather better. Cheaper in Yorkshire than in Lancashire. Drained Creosote Salts, £3 to £5 per ton. Demand rather better. Whizzed or hot pressed, £6 to £9 per ton.
Naphthalene.—Crystals and Flaked, £12 to £15 per ton, according to districts.
Pitch.—Medium soft, 40s. to 45s. per ton, according to district. Not much business.
Pyridine.—90/160, 18s. to 18s. 6d. per gall. Not much demand. Heavy, 11s. to 12s.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid H.—3s. 9d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—1s. 0½d. to 1s. 1d. per lb. Good demand.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—8d. per lb. naked at works.
Aniline Salts.—8d. per lb. naked at works
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s. 8d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3½d. to 4d. per lb. Poor demand.
m-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
p-Dichlorbenzol.—£85 per ton.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. 2d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. 2d. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
Monochlorbenzol.—£63 per ton.
a-Naphthol.—2s. 3d. per lb. d/d.
B-Naphthol.—1s. per lb. d/d.
a-Naphthylamine.—1s. 3½d. per lb. d/d.
B-Naphthylamine.—3s. 9d. per lb. d/d.
m-Nitraniline.—4s. 2d. per lb. d/d.
p-Nitraniline.—2s. 2d. per lb. d/d.
Nitrobenzene.—5½d. to 5½d. per lb. naked at works.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronapthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
o-Toluidine.—10d. per lb.
p-Toluidine.—2s. 4d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Market quiet, American competition still fairly keen.

Acetate of Lime.—Brown £11 to £11 5s. per ton d/d and upward. Quiet market. Grey, £15 to £15 10s. per ton. Firmer. Liquor, 9d. per gall. 32° Tw.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Fair demand.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 9d. per gall. 60% O.P. Solvent, 5s. per gall. 40% O.P.
Wood Tar.—£3 5s. to £4 per ton. Demand slack and stocks being held.
Brown Sugar of Lead.—£44 per ton. Steady market.

Rubber Chemicals

Antimony Sulphide.—Golden, 5½d. to 1s. 4d. per lb., according to quality. Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.
Arsenic Sulphide, Yellow.—1s. 11d. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—3s. 9d. to 4s. 3d. per lb., according to quantity.
Carbon Bisulphide.—£30 to £33 per ton, according to quantity.
Carbon Black.—6d. to 6½d. per lb., ex wharf.
Carbon Tetrachloride.—£62 10s. to £67 10s. per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—5d. to 9½d. per lb. Demand very brisk. Prices likely to remain steady owing to firmness of rapeseed oils.
Lamp Black.—£48 per ton, barrels free.
Lead Hyposulphite.—7½d. per lb.
Lithopone, 30%.—£22 10s. per ton.

Mineral Rubber "Rubpron."—£16 5s. per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£56 to £65 per ton.
Thiocarbanilide.—2s. 6d. per lb.
Vermilion, Pale or Deep.—5s 6d. per lb. Dearer.
Zinc Sulphide.—7½d. to 1s. 8d. per lb., according to quality.

Pharmaceutical and Photographic Chemicals

Acid, Acetic 80% B.P.—£45 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 11d. to 3s. 1d. per lb., according to quantity. Sales steady. Price firm.
Acid, Benzoic B.P.—2s. 6d. per lb.
Acid, Boric B.P.—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 4½d. per lb., less 5% for ton lots. Raw materials dearer, equal to ½d. per lb. on finished product.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots. Easier.
Acid, Pyrogallic, Crystals.—6s. per lb. for 1 cwt. lots. 7s. 6d. per lb. for 7-lb. lots according to quantity. Steady market.
Acid, Salicylic.—1s. 6d. to 1s. 7d. per lb., according to quantity. Steady market.
Acid, Tannic B.P.—2s. 9d. per lb. Quiet steady demand.
Acid, Tartaric.—1s. 1d. per lb., less 5%. Very firm. Demand good.
Amidol.—9s. per lb., d/d.
Acetanilide.—1s. 10d. to 2s. per lb. More inquiry.
Amidopyrin.—14s. 6d. per lb.
Ammonium Benzoate.—3s. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—12s. 6d. per oz. for English make.
Barbitone.—12s. 6d. per lb. Cheaper. Market less firm for Potash and Soda Salts.
Benzonaphthol.—5s. 3d. per lb. spot.
Bismuth Salts.—Prices reduced by about 1s. 3d. to 2s. 3d. per lb. on account of the fall in the price of the metal.
Bismuth Carbonate.—7s. 8d. to 9s. 8d. per lb. | Prices unsettled owing to difficulties in regard to supplies of the metal.
Bismuth Citrate.—8s. to 10s. per lb.
Bismuth Salicylate.—7s. 5d. to 9s. 5d. per lb.
Bismuth Subnitrate.—6s. 10d. to 8s. 10d. per lb.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 6d. to 1s. 8d. per lb., easier; sodium, 1s. 7d. to 1s. 9d. per lb., easier; ammonium, 1s. 11d. to 2s. 1d. per lb. Market less firm.
Calcium Lactate.—1s. 7d. to 1s. 9d., according to quantity. Fair demand and steady market.
Chloral Hydrate.—4s. per lb.
Chloroform.—2s. 6d. per lb. for cwt. lots.
Creosote Carbonate.—6s. 6d. per lb. Little demand.
Formaldehyde.—£44 per ton, in barrels ex wharf London.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d. per lb.
Guaiacol Carbonate.—8s. 3d. per lb.
Hexamine.—2s. 11d. per lb. For bold crystal. Powder slightly less.
Homatropine Hydrobromide.—25s. to 30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydroquinone.—4s. 3d. per lb. in cwt. lots. Foreign make.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 11d. to 2s. 3d. per lb.
Magnesium Carbonate.—Light Commercial, £36 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £72 10s. per ton, less 2½%, price reduced; Heavy Commercial, £25 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 50s. per lb., February delivery; Synthetic, 26s. to 35s. per lb. according to quality. English make. Increasing demand.
Mercurials.—Market very quiet. Mercury slightly easier. Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb.
Methyl Salicylate.—1s. 9d. to 1s. 11d. per lb.
Methyl Sulphonel.—21s. per lb.
Metol.—11s. per lb. British make.
Morphine and Salts.—Reduced by 1s. to 1s. 3d. per oz.
Paraformaldehyde.—2s. 8d. for B.P. quality.
Paraldehyde.—1s. 4d. to 1s. 6d. per lb., in free bottles and cases.
Phenacetin.—5s. 2d. per lb. in cwt. lots.
Phenazone.—6s. 6d. per lb.
Phenolphthalein.—4s. 8d. per lb. for cwt. lots.
Potassium Bitartrate 99/100% (Cream of Tartar).—86s. per cwt., less 2½% for ton lots. Raw material again dearer.
Potassium Citrate.—1s. 10d. to 2s. 2d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity Steady market.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included. f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., carriage paid; commercial, 8d. to 8½d. per lb., carriage paid. Forward prices higher.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—5s. per lb. In fair quantities. Supplies exceed demand.
Saccharin.—63s. per lb. in 50-lb. lots.
Salol.—3s. 6d. per lb., for cwt. lots. Slightly dearer.
Silver Proteinate.—9s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. per lb. From natural benzoic acid. Supplies of good quality available.
Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.
Sodium Hypophosphite, Photographic.—£13 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. per cwt., for ton lots and upwards.
Sodium Salicylate. Powder, 2s. 2d. to 2s. 3d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb. Flake, 2s. 6d. per lb. Strong demand, market firmer.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. per ton, minimum 5 ton lots, according to quantity; 1 cwt. kegs included.
Sulphonal.—14s. 6d. per lb. Little demand.
Thymol.—18s. per lb. Firmer.

Perfumery Chemicals

Acetophenone.—11s. per lb.
Aubepine.—12s. 6d. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 3d. per lb.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 9d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 9d. per lb.
Benzaldehyde free from Chlorine.—2s. 9d. per lb.
Benzyl Benzoate.—3s. 6d. per lb.
Cinnamic Aldehyde Natural.—16s. 6d. per lb.
Coumarin.—17s. per lb.
Citronellol.—20s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—12s. 6d. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—10s. 6d. per lb.
Geraniol. (Palmarosa).—31s. 6d. per lb.
Geraniol.—12s. 6d. to 20s. per lb.
Heliotropine.—6s. 9d. per lb.
Iso Eugenol.—16s. per lb.
Linalol ex Bois de Rose.—26s. per lb.
Linalyl Acetate.—26s. per lb.
Methyl Anthranilate.—10s. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—37s. 6d. per lb. Cheaper.
Musk Xylol.—12s. per lb. Cheaper.
Nerolin.—4s. 6d. per lb.
Phenyl Ethyl Acetate.—15s. 6d. per lb.
Phenyl Ethyl Alcohol.—14s. 3d. per lb.
Rhodinol.—50s. per lb.
Safrol.—1s. 10d. per lb.
Terpineol.—2s. 5d. per lb.
Vanillin.—25s. to 25s. 6d. per lb.

Essential Oils

Almond Oil, Foreign S.P.A.—13s. 9d. per lb.
Anise Oil.—2s. 6d. per lb.
Bergamot Oil.—16s. per lb.
Bourbon Geranium Oil.—28s. per lb.
Camphor Oil.—65s. per cwt.
Cananga Oil, Java.—11s. per lb.
Cinnamon Oil, Leaf.—6d. per oz.
Cassia Oil, 80/85%.—9s. per lb.
Citronella Oil.—Java, 85/90%, 5s. 9d. per lb. Ceylon, 3s. 2d. to 3s. 5d. per lb., according to quality.
Clove Oil.—7s. 9d. per lb.
Eucalyptus Oil, 70/75%.—2s. 1d. per lb.
Lavender Oil.—French 38/40% Esters, 35s. per lb.
Lemon Oil.—3s. 4d. per lb.
Lemongrass Oil.—5s. 9d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 42s. 6d. per oz. Anatolian, 28s. per oz.
Palma Rosa Oil.—16s. 9d. per lb.
Peppermint Oil.—Wayne County, 62s. 6d. per lb. Again dearer. Japanese, 20s. per lb.
Petitgrain Oil.—9s. 9d. per lb.
Sandal Wood Oil.—Mysore, 26s. 7d. per lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, February 19, 1925.

THERE has been rather better inquiry in the heavy chemical market during the past week, but the volume of business passing still leaves much to be desired. Prices both for home and Continental products are on about the same level as last reported, with the exception of arsenic, which is quoted still lower.

Industrial Chemicals

ACID ACETIC.—Still in poor demand, but prices remain practically unchanged. 98/100% glacial quoted £56 to £67 per ton according to quality and packing. 80% pure about £43 to £45 per ton. 80% technical, £42 to £44 per ton. Packed in casks delivered c.i.f. U.K. port, duty free.

ACID BORACIC.—Remains unchanged. Crystal or granulated, £45 per ton; powdered, £47 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—In moderate demand and price unchanged at 5¾d. per lb. delivered, but could probably be obtained for less.

ACID CITRIC, B.P. CRYSTALS.—Unchanged at 1s. 4½d. per lb., less 5% ex store.

ACID FORMIC 85%.—Offered from the continent at about £50 per ton c.i.f. U.K. port. Spot material available at about £52 10s. per ton, ex store.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC 80°.—£23 10s. per ton ex station, full truck loads.

ACID OXALIC 98/100%.—Spot material unchanged at about 3¾d. per lb., ex store. Offered from the continent at about 3½d. per lb., ex wharf.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Rather better inquiry. Price now about 1s. per lb., less 5% ex store. Offered for forward delivery at about 11¾d. per lb., less 5% ex wharf.

ALUMINA SULPHATE 17/18%, IRON FREE.—Spot lots unchanged at about £7 5s. per ton, ex store. Offered for prompt shipment from the continent at about £6 12s. 6d. per ton c.i.f. U.K. port.

ALUM.—Lump potash alum, spot material available at £9 12s. 6d. per ton, ex store. Offered for prompt shipment from the continent at about £8 7s. 6d. per ton c.i.f. U.K. port.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 6d. per lb., ex station. Containers extra and returnable, with possible slight reduction for large quantities.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks delivered U.K. port.

AMMONIA LIQUID 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb. delivered, according to quantity; containers extra.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture unchanged at about £30 per ton, ex station, packed in casks. Bags £1 per ton less. Offered from the continent at about £25 10s. per ton, c.i.f. U.K. port. Fine white crystals offered from the continent at about £21 per ton, c.i.f. U.K. port.

ARSENIC, WHITE POWDERED.—Spot lots now quoted £34 per ton, ex store. Offered for early delivery at about £32 per ton, ex wharf.

BARIUM CHLORIDE 98/100%.—Spot material of English manufacture available at about £11 10s. per ton, ex store. Fine white crystals offered from the continent at about £9 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots quoted £10 10s. per ton, ex station; contracts 20s. per ton less.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. port.

BORAX.—Unchanged. Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton, ex station. Continental rather dearer at about £4 2s. 6d. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £3 5s. per ton, ex works, packed in casks, free.

COPPER, SULPHATE.—Offered from the continent at about £23 15s. per ton, c.i.f. U.K. port. Spot lots available at about £24 per ton, ex store. British material quoted £24 10s. per ton, f.o.b. U.K. port.

FORMALDEHYDE 40%.—Offered from the continent at about £42 per ton, c.i.f. U.K. port, prompt shipment. Spot lots available at about £45 to £46 per ton, ex store.

GLAUBER SALTS.—White crystals of English manufacture unchanged at £4 per ton, ex store or station. Offered from the continent at about £3 7s. 6d. per ton, c.i.f. U.K. port.

LEAD, RED.—Spot lots of imported material available at about £44 to £44 10s. per ton, ex store, spot delivery.

LEAD, WHITE.—Quoted £46 10s. per ton, ex store.

LEAD, ACETATE.—Refined white crystals offered from the continent at about £47 per ton, c.i.f. U.K. ports. Spot material available at about £49 to £50 per ton, ex store. Dark brown quality quoted £40 per ton, c.i.f. U.K. port.

MAGNESITE, CALCINED.—Unchanged at about £7 17s. 6d. per ton, ex station, prompt delivery. Hard burnt quality quoted £4 15s. per ton, ex station. Finer quality of continental manufacture quoted £7 15s. per ton, c.i.f. U.K. port.

MAGNESIUM CHLORIDE.—Slightly cheaper quotations from the continent. Now on offer at about £4 per ton, c.i.f. U.K. port.

POTASH CAUSTIC 88/92%.—Offered at £29 per ton, ex wharf, for early delivery. Spot material available at about £30 10s. per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5d. per lb., delivered.

POTASSIUM CARBONATE 96/98%.—Spot lots on offer at about £25 per ton, ex store. Offered for prompt shipment from the continent at about £24 per ton, c.i.f. U.K. port. 90/92% quality quoted £21 5s. per ton, c.i.f. U.K. port.

POTASSIUM CHLORATE.—Quoted 2¾d. per lb., c.i.f. U.K. port. Spot lots on offer at about 2⅝d. per lb., ex store.

POTASSIUM NITRATE, SALTPETRE.—Refined granulated 99% on offer at about £25 per ton c.i.f. U.K. port, prompt shipment from the continent. Spot material available at about £28 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Unchanged at about 8¾d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE, YELLOW.—Spot material on offer at about 7¾d. per lb., ex store. Offered for early delivery at a fraction less ex wharf.

SODA CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 2s. 6d. per ton; broken 60%, £17 2s. 6d. per ton. Powdered 98/99%, £21 7s. 6d. per ton, all carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Quoted £23 per ton, ex store, spot delivery; offered from the continent at about £20 2s. 6d. per ton c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station; M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton more; alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted, £9 15s. per ton, ex station. Continental, about £9 5s. per ton, ex store. Offered for forward delivery at about £8 5s. per ton c.i.f. U.K. port. Pea crystals of English manufacture quoted £14 per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 17s. 6d. per ton ex store; 96/98% refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE 100%.—Offered from the continent at about £24 15s. per ton c.i.f. U.K. port.

SODIUM PRUSSIATE, YELLOW.—In moderate demand and price unchanged at 4½d. per lb., ex store.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton, f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English manufacturers quote 60/65% solid, £15 per ton; broken, £1 per ton more; flake, £2 per ton more; crystals, 31/34%, £9 5s. per ton, carriage paid U.K. stations. Minimum 4 ton lots with slight reduction for contracts over a period. Solid 60/62% offered from the continent at about £11 10s. per ton c.i.f. U.K. port. Crystals, 30/32%, £8 7s. 6d. per ton c.i.f. U.K. port.

SULPHUR.—Flowers, £9 10s. per ton; Roll, £8 10s. per ton; Rock, £8 7s. 6d. per ton; Ground, £8 5s. per ton, ex store. Prices nominal.

ZINC CHLORIDE 96/98%.—Continental manufacture quoted £23 per ton c.i.f. U.K. port. English material for export on offer at about £25 to £26 per ton f.o.b. U.K. port.

ZINC SULPHATE.—Spot material quoted £12 10s. per ton, ex store; in little demand.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

AMIDO ACID.—Small export inquiry. Price 3s. 10d. per lb. 100% basis.

ALPHA NAPHTHYLAMINE.—Good export inquiry. Price 1s. 3d. per lb., f.o.b.

AMINO AZO BENZOLE.—Some home inquiry. Price 2s. 10d. per lb. delivered.

BETA NAPHTHYLAMINE.—Good export inquiry. Price 3s. 6d. per lb., f.o.b.

GAMMA ACID.—Fair export inquiry. Price 10s. per lb. 100% basis, f.o.b.

H. ACID.—Good home inquiries. Price 3s. 9d. per lb. 100% basis, delivered.

META TOLUYLENE DIAMINE SULPHONIC ACID SODIUM SALT.—Some export inquiry. Price 4s. 6d. per lb., f.o.b.

META TOLUYLENE DIAMINE.—Export inquiry. Price 3s. 10d. per lb. 100% basis.

META PHENYLENE DIAMINE.—Export inquiry. Price 4s. per lb., f.o.b.

NEVILLE WINTHER ACID.—Export inquiry. Price 5s. 8d. per lb. 100% basis, f.o.b.

ORTHO AMIDO PHENOL BASE.—Good home and export inquiries. Price 9s. 6d. per lb. 100% basis.

PARA AMIDO ACETANILIDE.—Some export inquiry. Price 4s. 11d. per lb. 100% basis, f.o.b.

SS ACID.—Some export inquiry. Price 11s. 6d. per lb. 100% basis, f.o.b.

TOLIDINE BASE.—Export inquiry. Price 6s. 10d. per lb. 100% basis, f.o.b.

TOLUYLENE DIAMINE SULPHONIC ACID.—Moderate export inquiry. Price 8s. 5½d. per lb. 100% basis, f.o.b.

The Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, February 19, 1925.

THE movement of heavy chemicals on the Manchester market this week has been rather restricted, and the demand from home users, as well as for shipment, has been relatively quiet. Shipments have been made to India, Australia, and other Eastern parts, and also to the Continent, but for the most part they have been confined to a limited range of products, and the aggregate bulk of the orders is not very substantial. Generally speaking, quotations with a few outstanding exceptions—cases where continued weakness has been a feature for some time—has been pretty well maintained.

Heavy Chemicals

Sodium sulphide is fairly steady, although the demand is quiet; 60 to 65 per cent. concentrated solid is offering at £13 15s. to £14 per ton, and crystals at round £9 10s. Phosphate of soda is selling slowly at £13 per ton. Soda crystals are in quietly steady request, with values about unchanged at about £5 5s. per ton. Saltcake is in small inquiry at £4 per ton. Glauber salts are attracting a very limited amount of interest, with prices on the same level as last week, at £3 10s. per ton. Caustic soda keeps firm at from £15 12s. 6d. per ton for 60 per cent. strength to £18 for 76 to 77 per cent. material, and a fair amount of business is being done. Prussiate of soda is quiet and easier again at round 4d. per lb. Hyposulphite of soda is in moderate request at £13 10s. to £13 15s. per ton for photographic crystals and £9 10s. for commercial quality. Bleaching powder is rather inactive at about £9 10s. per ton. Alkali is steady and in moderate demand at £6 15s. per ton. Acetate of soda is in poor request, and a shade cheaper at £20 per ton. Bichromate of soda is in fair inquiry, and prices are maintained at 4d. per lb. Chlorate of soda is still quiet, but unchanged, at 2⅝d. per lb. Bichromate of soda is in comparatively limited demand, although quotations are held at about £10 10s. per ton.

Among potash compounds caustic keeps steady at £30 to £31 per ton, with business on a small scale. Carbonate of potash is unchanged, at £23 10s. to £24 per ton, a moderate volume of trade being put through. Bichromate of potash is still on offer at 5d. per lb., but the demand for this material is limited. Prussiate of potash is still easy, although not quotably changed from last report, current values ranging round 7¼d. per lb. Chlorate of potash is rather quiet, but steady, at 2¾d. per lb. Quotations for permanganate of potash vary from about 6¾d. to 8d. per lb., according to quality.

Arsenic continues dull and featureless, with values on the easy side; white powdered, Cornish make, is currently quoted at round £35 per ton in Manchester. Sulphate of copper is a comparatively quiet section of the market, at £24 15s. to £25 per ton. Commercial Epsom salts are firm, at £4 10s. to £4 15s. per ton, with magnesium sulphate, B.P. quality, offering at £6 15s. per ton. Acetate of lead is rather quiet, but steadier again at £47 10s. for white and £43 per ton for brown. Acetate of lime is in moderate demand, with values little changed, at £15 10s. per ton for grey material and £10 10s. to £11 for brown. Nitrate of lead is on offer at £41 10s. to £42 per ton.

Acids and Tar Products

With the exception of oxalic, a fair demand is being experienced for the acids. Tartaric and citric acids are firm, at 1s. 0½d. and 1s. 4½d. per lb. respectively. Acetic acid is unchanged, at £41 to £41 10s. for 80 per cent. commercial and £67 to £68 per ton of glacial. Oxalic acid continues dull and weak at about 3½d. per lb.

Pitch is a trifle steadier, though not much business is being done; the current quotation here is about 45s. per ton. Carbolic acid is still quiet, at 5¾d. per lb. for crystals and about 1s. 9d. per gallon for crude. Solvent naphtha is only in small demand at 1s. 5½d. per gallon. Naphthalenes are quoted at £15 10s. for refined and £5 5s. and upwards for crude. Creosote oil is on offer at round 7d. per gallon.

Society of Chemical Industry

Annual Meeting at Leeds in July

THE annual meeting of the Society of Chemical Industry is to be held in Leeds this year, during the week commencing July 14. It is 14 years since the Society last visited Yorkshire, the venue in 1911 being Sheffield. The last gathering held in Leeds was in 1895, four years after the formation of a Yorkshire section. The present chairman of the Yorkshire section is Mr. John Evans, of Sheffield. A handbook will be published, which will serve as a guide to the industries of the district. Professor N. M. Comber, Professor in Agricultural Chemistry at the University of Leeds, who is secretary of the Yorkshire section, will undertake the duties of local secretary in connection with the meeting, and he will have the assistance of Mr. O. Anderson, of the Agricultural Department of Leeds University.

Death of Mr. J. W. Garson

WE regret to announce the death, on February 6, of Mr. James W. Garson, vice-chairman of Lewis Berger and Sons, Ltd., and one of the most widely known and respected figures in the paint, colour, and varnish industry. For more than 37 years (a correspondent writes) Mr. Garson had given his energy and the fruits of his unique knowledge and experience to the company whose interests filled his life. The remarkable expansion of the business in the past 20 years fully crowned his labours, and it must have been with a consciousness of duty well and truly done that he permitted himself—only within the past year—to lay aside the more strenuous cares of the office of managing director which he had borne so long, for the only slightly less exacting responsibilities of vice-chairman. A worthy successor to the long line of Bergers who during 165 years had built up the business and with the last of whom he had been personally associated, Mr. Garson leaves a tradition and example which will live and inspire so ong as the house of Berger stands.

"Yadil"

THE action, Gifford *v.* Clement and Johnson, Ltd., proprietors of Yadil, came before Mr. Justice Tomlin in the Chancery Division on Tuesday as a motion for judgment, there being no defence. It was an action by two debenture holders holding five debentures of £100 each.

His lordship remarked that he was not impressed with the rapidity with which the action was proceeding, and he thought it as well that it should be known to those concerned that he should expect it to proceed with proper diligence, or else he might direct some steps to be taken with regard to it. The delay was attributed to a change of solicitors, and his lordship said he would make an order in the terms of the minutes with certain alterations.

Company News

SHAWINIGAN WATER AND POWER.—A dividend of $1¾ per share has been declared on the common shares for the quarter.

EASTMAN KODAK COMPANY OF NEW JERSEY.—The regular dividend of 1.25 dol. is announced and an extra dividend of 75c. per share on the common stock.

UNITED TURKEY RED CO.—A final dividend is recommended on the ordinary shares at the rate of 7½ per cent., less tax, placing £40,000 to general reserve, and carrying forward £32,250.

NORTH BROKEN HILL, LTD.—Dividend No. 61 of 2s. and a bonus of 2s., total 4s. per share, less income tax, have been declared payable on March 30 to shareholders on the register on February 18.

BRITISH ALIZARINE CO.—The directors have declared a dividend of 2½ per cent., actual, less tax, for the year to December 31 last, against a dividend of 5 per cent., free of tax, for the previous year.

IDRIS HYDRAULIC TIN, LTD.—An interim dividend of 1s. per share, less tax, in respect of the year ended December 31, has been declared, payable on February 27. This is the fourth interim dividend on account of the year 1924.

ALEXANDER, FERGUSSON AND CO.—The directors have decided to recommend a dividend of 12½ per cent., less tax, for the year to December 31 last, together with a bonus of 5 per cent., making the year's distribution the same as for the previous year.

INDESTRUCTIBLE PAINT CO.—For the year 1924 the profits were £18,734. A dividend of 10 per cent. is proposed, adding to the taxation reserve £2,750, writing off reconstruction expenses £2,078, placing to the reserve £5,000, and carrying forward £1,406.

INTERNATIONAL PAINT AND COMPOSITIONS, LTD.—The directors have decided to recommend a final dividend of 4 per cent. on the ordinary shares, less tax, making 6 per cent. for the year. The usual half-yearly final preference dividend of 3 per cent., namely, 6 per cent. per annum, is also recommended.

HARRISON, BARBER AND CO., LTD.—The directors propose recommending to the shareholders at the annual meeting to be held on February 26, at the Cannon Street Hotel, London, a dividend of 13 per cent. per annum for the six months ended December 31, 1924, making, with the interim dividend of 5 per cent. for the first six months, 9 per cent. for the year.

BORAX CONSOLIDATED, LTD.—The report for the year ended September 30 last shows that the profits were £426,192, and £137,081 was brought forward. A final dividend of 1s. 6d. per share on the deferred ordinary shares is proposed, making 12½ per cent. for the year, adding to the depreciation reserve £30,000, to the general reserve £25,000, and to the pensions fund £5,000, and carrying forward £165,773.

NEW TAMARUGAL NITRATE CO.—The report for the year to July 31 last, shows a gross profit of £139,986. After deducting London expenses, and adding £14,729 brought forward, there is a balance of £149,295. Deducting 4 per cent. interest on income bonds, £6,214 for amortisation of income bonds, and interim dividend of 10 per cent., there remains £113,547. The directors propose to pay a further dividend of 25 per cent. (5s. per share), leaving £45,308 to be carried forward.

YORKSHIRE INDIGO, SCARLET AND COLOUR DYERS, LTD.—After providing for depreciation of dyehouses, leasehold property, plant and machinery and all other charges, the trading for the year 1924 resulted in a profit of £10,371, and £3,561 was brought in, making £13,932. The interest on debenture stock amounted to £4,572, leaving a balance of £9,360. The directors recommend a dividend on the preference and ordinary shares at 5 per cent. for the year, less tax, carrying forward £3,536.

BRADFORD DYERS' ASSOCIATION, LTD.—The profits for the year to December 31 last amounted to £944,141, and after providing for debenture interest, depreciation and other charges, the net profits were £658,287, compared with £739,227 for the previous twelve months. The directors propose to again bring the dividend up to 25 per cent. on the ordinary shares. This time, however, they do not recommend any addition to the reserve, but prefer to increase the sum carried to the new account by about £190,000. A year ago £250,000 was added to the reserve.

CANADA CEMENT CO.—The annual statement for the year 1924 states that the volume of business was slightly less than in 1923. During the year the company made a substantial reduction in the selling price of its product, with the result that cement is sold in Canada at a lower price than in any other country. The directors confidently expect, if the demand improves, to be able to still further reduce the price. In 1919 the sum of $1,011,119 was transferred from surplus to fire insurance reserve, which reserve has been accumulating, and they are now able to transfer $500,000 from fire insurance reserve to surplus. They hope before many years are over to be able to transfer back to surplus the remainder of the $1,011,119. The company's income, derived from sources other than the manufacture and sale of cement, reached the sum of $544,145.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

AGENT'S SERVICES OFFERED.—A manufacturer's representative of Santo Domingo City wishes to represent British manufacturers and exporters of crude drugs and chemicals. (Reference No. 196.)

COPPER, ZINC, LEAD, ETC.—An agent at Nurnberg, reported to have important connections with the metal factories, is desirous of securing the representation on a commission basis for the whole of South Germany of British exporters of the above. (Reference No. 181.)

AGENTS' SERVICES OFFERED.—A firm of chemical, etc., engineers established in Calcutta, wish to represent a British firm manufacturing horizontal steam engines from 10-300-400 h.p. The territory the firm can cover is Bengal, Bihar, and Orissa, United Provinces, Central Provinces and Assam. Terms suggested are—small office allowance, commission on sales, and principals to defray advertising expenses. (Reference No. 171.)

CREOSOTE.—The Municipal Council of Johannesburg is calling for tenders, to be presented by March 5, for supply and delivery of 135 short tons of creosote. (Reference No. BX 1575.)

PITCH.—An agent, established at Alais (Gard), wishes to represent British firms supplying pitch for the manufacture of briquettes. (Reference No. 204.)

TAR.—Specification No. 1, 7,000 gals. for Soyland Urban Council. Tenders to Surveyor, Ripponden, Yorkshire, by February 23.

Tariff Changes

UNION OF SOUTH AFRICA.—A proclamation provides that a rebate of the whole Customs duty shall be allowed on oils used in the lubricating of yarn in the process of weaving.

CHILI.—A recent Decree-Law permits the importation of 4,000 metric tons of sulphur into Chili free of Customs duty. The sulphur must be imported through ports of the Provinces of Tarapaca and Antofagasta within six months of December 4, 1924.

PANAMA.—A new Customs Tariff, involving many important amendments, is proposed.

Germany's Chemical Industry

ACCORDING to an official Department of Overseas Trade report, the general situation in Germany's chemical industry remained unchanged during January. In the chemical preparations industry there was a marked decline in business as a result of the internal political conditions and the crisis in foreign policy owing to the non-evacuation of the Cologne zone and to the fact that the Customs negotiations in Paris had not been concluded. The potash industry was well employed, as the mild weather in January promoted inland sales. Foreign trade, specially in sulphates, was also exceedingly brisk, so that old stocks were cleared. Japan and China, in particular, placed fairly large orders for kainit. The total sales considerably exceeded those in 1924. The oil industry maintained its sales, but business was not brisk.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

GREENHALGH (JOHN) (VICO PRODUCTS), LTD., 61, Old Broad Street, E.C., oil refiners. (C.C., 21/2/25.) £21 10s. 1d. January 2.

KNOX WALKER (J.) AND CO., LTD., 422, Kingsland Road, Dalston, manufacturing chemists. (C.C., 21/2/25.) £10 4s. 5d. January 15.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

ELEPHANT CHEMICAL CO., LTD., London, S.E. (M., 21/2/25.) Registered February 5, Land Registry charge to bank, charged on 127, 133, 135 and 137, Cobourg Street, 3 and 5, Dalbiac Street, and 171, 173, and 175 and smithy, etc., Neate Street, Camberwell; also registered February 5, £1,000 Land Registry charge, to Miss M. E. Harris, 173, Neate Street, Camberwell; charged on above properties. *Nil. July 30, 1924.

FENWICK (JOHN) AND SON, LTD., Newcastle-on-Tyne, dyers. (M., 21/2/25.) Registered February 6, mortgage, to bank; charged on 37, Sadler Street, Durham, and 2 and 3, Bishopston Lane, Stockton-on-Tees. *£4,641 bank overdraft and creditors. September 18, 1924.

FLINN AND SON, LTD., Fishersgate, dyers. (M., 21/2/25.) Registered February 4, £3,000 mortgage, to Sir B. S. Johnson, Abbot's Lea, Woolton, and others; charged on 24, Hill Street, Richmond (Surrey). *£8,850. April 2, 1924.

HEYL'S COLOURS, LTD., London, S.E. (M., 21/2/25.) Registered February 5, £15,000 debenture, to Neville Foster and Co., Ltd., 15, Throgmorton Avenue, E.C.; charged on land in Windmill Road, Luton; also general charge.

KEELINGS OXIDES (1921), LTD., Stoke-on-Trent. (M., 21/2/25.) Registered February 10, £14,600 debentures, part of £50,000 and bonus of 5 per cent.; general charge. *£20,000. January 23, 1923.

PARIPAN, LTD., London, W., paint manufacturers. (M., 21/2/25.) Registered February 4, £11,000 mortgage and Land Registry charge, to Century Insurance Co., Ltd., 18, Charlotte Square, Edinburgh; charged on 4 and 14, Belgrave Square. *£45,000. February 12, 1924.

TAYLOR'S DRUG CO., LTD., Leeds. (M., 21/2/25.) Registered February 6, £1,000 mortgage, to T. Waide, Applegarth House, Woodlesford, printer; charged on 105, Carlton Street, Castleford. *£111,744 0s. 11d. September 12, 1924.

London Gazette, &c.

Winding Up Petition

CHLOROPHYL AND CHEMICAL CORPORATION, LTD. (W.U.P., 21/2/25.) A petition for winding up has been presented and is to be heard at the Royal Courts of Justice, Strand, London, on February 24.

Companies Winding Up Voluntarily

CHILD (E.) AND CO., LTD. (C.W.U.V., 21/2/25.) By special resolution January 26, confirmed February 9, D. J. Brannan, 9–10, King Street, London, E.C.2, appointed liquidator.

NAYLOR (RICHARD), LTD. (C.W.U.V., 21/2/25.) C. T. Wood, 69, Corporation Street, Manchester, appointed liquidator, February 6.

WHITE OIL PRODUCTS CO., LTD. (C.W.U.V., 21/2/25.) E. Louis, 24, St. Helen's Road, Westcliff-on-Sea, chartered accountant, appointed liquidator, February 10.

New Companies Registered

ANDRADE NITRATE CO., 145, Dashwood House, Old Broad Street, London, E.C. To acquire lands, estates, nitrate and other deposits and properties in the U.K., Republic of Chili or elsewhere, and to carry on the business of manufacturers and exporters of and dealers in nitrates, iodine, and other similar products; manufacturing chemists, etc. Nominal capital, £115,000 in 114,985 ordinary shares of £1 and 300 "B" shares of 1s.

BRITISH OXIDES, LTD.—Zinc oxide manufacturers, preparers for market of zinc and copper ores, including zinc blende, pyrites, cadmium, cuprite, malachite; manufacturers of copper and other oxides, sulphate and sulphite and all products of metals, whether ferrous or non-ferrous, etc. Nominal capital, £1,000 in £1 shares. A subscriber: W. Holmes, 5, Rowhope Street, Hebburn-on-Tyne.

MARSHALLS (CHEMISTS), LTD., 78, High Street, Kingsland, London, E.8. Manufacturing chemists, drysalters, perfumers, etc. Nominal capital, £500 in £1 shares.

MONTAGU HIGGINSON (LONDON), LTD., 13, Victoria Street, London, S.W.1. Coal and coke factors; manufacturers of chemicals and manures; distillers; dyemakers, etc. Nominal capital, £30,000 in £1 shares (20,000 6 per cent. cumulative preference, free of income tax, and 10,000 ordinary).

SOLMAR SOAPS, LTD., 11–12, Finsbury Square, London, E.C.2. Soap and perfumery makers and dealers; manufacturing chemists, druggists, drysalters, oil and colour men, manufacturers of and dealers in alcohol, acid, pharmaceutical, medicinal, chemical, industrial and other preparations, etc. Nominal capital, £60,000 in 5s. shares.

Du Pont Company and Synthetic Ammonia

A PLANT site for the manufacture of synthetic ammonia has been purchased at Clinchfield, Va., by Lazote, Inc. (a corporation organised by E. I. du Pont de Nemours and Co.). The new corporation, after careful study of the several known processes, has acquired the Claude synthetic ammonia process and will install it. Field work and construction operations will be started in the early spring and it is expected that the plant will be in operation by the end of the year. Plans provide for a capacity of 25 tons of ammonia a day and they also allow for substantial enlargement. The site adjoins coalfields, which will supply the power and raw material, investigations having shown that in the synthetic ammonia process coal or coke can be used more economically than water power in the production of the essential raw materials. Heretofore it has been considered necessary to have cheap hydro-electric power for the operation of synthetic ammonia or fixed nitrogen processes. The special equipment and machinery which will be required are being constructed in the shops of the du Pont Co., and will be ready for installation by the time the buildings are complete.

The "Blue Book"

THE forty-third edition of *The Electrician* Electrical Trades Directory and Handbook, familiarly known as the "Blue Book," has just been published. It can be obtained from Benn Brothers, Ltd., at the price of 25s. net. Compared with the usual run of blue books it contains a vast amount of really useful information, and this utility has been increased in the 1925 edition by careful revision. That portion of the Legal Digest which relates to electricity supply has been entirely re-written by the well-known barrister, Mr. Alfred Tylor, and is a concise summary which will save its users the trouble of referring to the more ponderous legal works on the subject. The difficulty of keeping the Directory up-to-date increases each year, but no pains have been spared to make it as complete as possible. This has been so successful that it may be said without fear of contradiction that it is a book which no one connected with the electrical industry can afford to be without.